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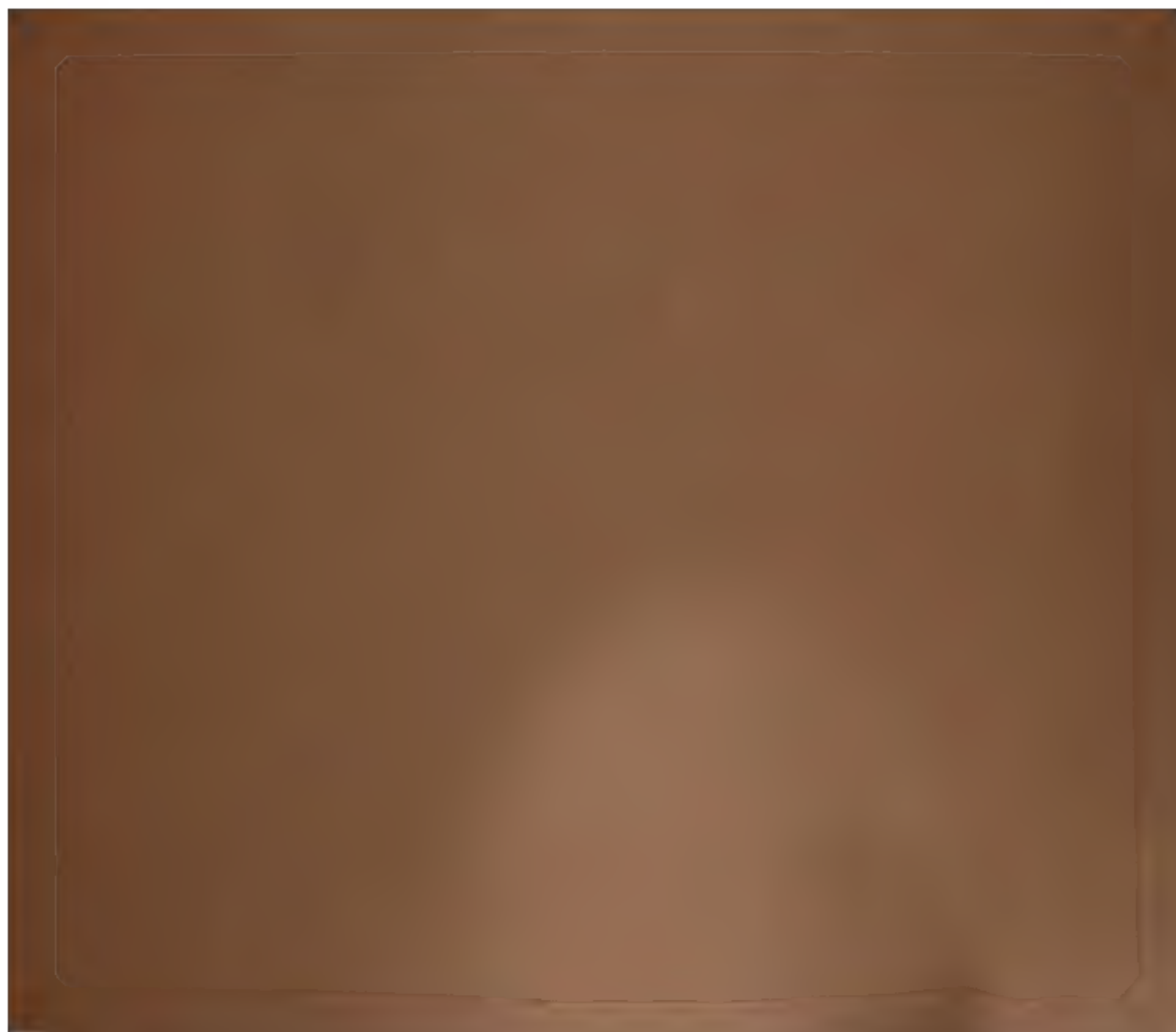
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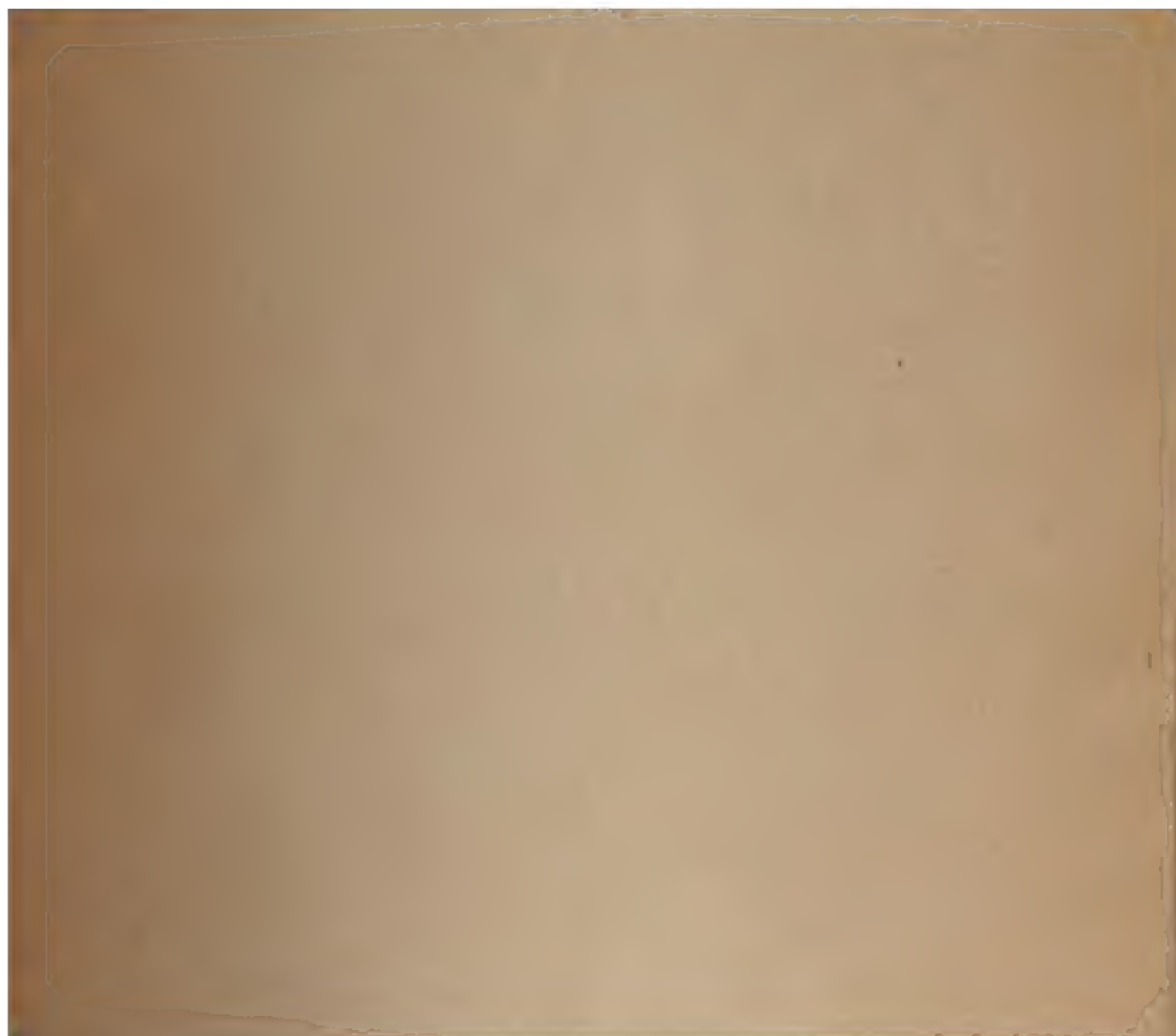


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REPORT OF THE SECRETARY OF THE BOARD.

To His Excellency Robert S. Green:

GOVERNOR—In presenting to your Excellency, on behalf of the State Board of Health of New Jersey, its twelfth report, I also have the honor to present the tenth report of Vital Statistics. So soon as the State Board of Health was established, it became apparent that a new law was needed to secure a more perfect return of the marriages, births and deaths occurring in the State. These form the account which the State keeps of the movements of its population—that material which takes the lead in all its vital resources. This record forms, in many respects, the basis of health administration and by facts and comparisons indicates those preventable agencies which are at work to destroy life or to sap the vigor of the people. Until the last year this bureau retained its connection with the Department of State. At the instance of the honorable Secretary of State and by the action of the Legislature, the bureau has been transferred so as to become fully identified with the health department. This much increases the work of the office, although no additional appropriation was made. This closer connection is manifestly proper, and will enable us still more vigorously and effectively to study the great health problems which have so much to do with the industries and happiness of our people.

The details as to the general health in different parts of the State will be found in the statistics of this last report. There will also be found decennial tables giving important facts as to vital statistics for these last ten years. Thus, by the large number of people represented and the number of years, the possibility of error from small numbers is eliminated, and still more significant facts brought out. The year has been one with a fair degree of health. With our rapid increase of population, especially in our cities, it is to be remembered that the prevention of an increase of the death-rate is something of an achievement. The year has been marked by no special epidemic or endemic,

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except that in a few instances diphtheria has proved a serious endemic in some localities. Even in these cases the people have seen, when in part too late, how the closing of schools, the prohibition of public funerals and strict isolation, cleanliness and disinfection would have saved many a life.

LOCAL BOARDS OF HEALTH.

The prominent feature of the year has been the more complete organization of Local Boards of Health. While these may act without published ordinances, yet a published code greatly facilitates their work. A large number, both of the city and township Boards, have adopted new sets of ordinances or revised old ones. The result has been a more thorough enforcement. It has also come to be recognized that a Sanitary Inspector is a necessity in all cities, towns and villages, and where these have been appointed some excellent work has been done.

There is much need of some method of training Inspectors in their duties, in teaching them how to prevent nuisances as well as to abate them, and also that Local Boards require a daily or weekly return and record of the work done or needing to be done. One cannot study the systematized methods of New York city, for instance, without being struck with the invaluable benefit of that exactness of method which is applied in all well-conducted departments of public business. New York, for instance, is furnished with over twenty constant Inspectors, besides some special ones in summer. Complaints received are at once mailed to the Inspector of the district to which they relate. At the end of the week each Inspector sends to the central office a detailed statement of his week's work; from it he makes up a tabulated summary, which is submitted to the Sanitary Superintendent. Besides the prompt action of each Inspector in particular cases, further orders are then given as to the dealing with particular nuisances. In Asbury Park, Newark and Paterson this plan is somewhat carried out, and to an imperfect degree in many other cities and localities.

While there is much in the local health administration of the State for which we have reason to be grateful, yet when we compare ourselves with the most advanced cities, and especially those of England, we have reason to reach forth toward much greater perfection

both in administration and the appliances for administration. In addition to house-to-house inspection and all the details which belong to a perfect system of sanitary inspection, nearly every city of over 20,000 inhabitants needs (a) a place to which cases of contagious disease can be taken for isolation and so as to give opportunity to fumigate and cleanse the locality in which it occurred; (b) a disinfecting apparatus (see XI., 1886, Report of A. P. H. Association), to properly disinfect all clothing exposed to contagion; (c) a garbage destructor, in which can be consumed decayable substances; (d) facilities for bathing for all classes, not to mention many minor needs. All these cannot be secured at once, but every intelligent Health Officer has such aids in view. No form of tax is so well expended as that which protects the public health, and it is believed that public opinion will more and more support such liberal expenditures in defense of the common health as are consistent with a true economy.

While the educational work of the State Board and Local Boards will never fully cease, we are feeling that the great work now to be pressed upon localities is that of more efficient administration.

The State reports will not need to be so full, since the sources of sanitary information have multiplied a hundred-fold since our work began. In these reports we shall seek more fully to devote ourselves to the explanation and elucidation of practical methods of local prevention of nuisance and enforcement of law. This State has now given abundant authority to Local Boards, and in the act of last winter, giving them, in all cities and towns, power over the construction and plumbing of buildings, has added almost the only indispensable requisite to thorough sanitary control.

In order more fully to secure this thorough local administration, the State Board has given special attention the last year to personal instruction of localities. General Inspectors have been employed and the Boards have more fully looked to us for reliable opinion and advice. We thus have been able, as never before, to put ourselves in close connection, with the most marked sanitary advantage.

It would be well if the appropriation permitted us to extend the system, but even with what we have, very much is being done.

In further details to be found in the Secretary's report and in the various articles and communications from Local Boards appended thereto, we believe your Excellency, the Legislature and our citizens generally will find much valuable information.

PUBLIC HEALTH.

We shall not attempt to argue the question whether health is so great a public concern as to require the attention and oversight of the State. This has already been determined by the precedent established by all civilized countries, and by the growing attention everywhere given thereto. The highest object of the State is the welfare of the citizen. This does not mean that the State must concern itself with everything that relates to his welfare, since some things must necessarily be left to private and personal concern. But it does mean that in those respects in which political economy and the thrift of the State are concerned, in which private conditions largely involve individual interests, and in those matters which, as being general, must be regulated by law, the citizen must be governed so as not to imperil the life and health of his neighbor. It is in this spirit that ancient law and civilization dealt with epidemics, established quarantines, and made nuisances a misdemeanor at common law. It is a higher and a better regulation, when, within proper domain, it attempts to prevent those evils which imperil the life and health of communities by those preventive and regulative measures which diminish both death-rate and sickness-rate, and so materially add to the population, to the working capital and the vital resources of a nation.

As a consequence, the organic law of this necessity is no longer discussed. The only question is, what regulation shall be exercised by the city or the rural precinct, independent of its neighbor, or what other regulation or oversight shall be sought or exercised by the State or the nation.

It is in accord with the genius of our government to allow home rule of these matters to a large extent and so far as is consistent with the integrity of the adjacent districts. A city, for instance, can properly determine what nuisances shall not be allowed within its borders. But if the result is to expel, to a smaller town outside of its limits, a nuisance none the less serious to the citizens of that town, it, although a more rural district, must somehow have its rights protected. In order that these various divisions of a State may be protected and yet not infringe on each other's right, some State regulation is required. The very success of the system demands a harmony in adjustment such as can only be had by so much of general or State law as shall reach this object.

A second important function of a State is to impart such information as to so vital an interest as the public health, as shall enable the citizen to avail himself of those advantages of protection which arise from knowledge of the evils to which he is or may be subjected, and the best mode of avoidance or riddance. It is on this principle that education is made so largely available at the cost of the whole State and not left to be a city or neighborhood measure; that the people generally are informed as to the vital resources which may be made available, and even the newspaper is dealt more liberally with on the ground that it is a great educator of the masses, and so conserves the welfare of the State. While there are proper limitations of the degree to which such a function should be exercised, yet when we know that life and health are the most vital resources of a State, it behooves that we at least conserve it with a liberality equal to that which is extended in promoting our other resources or in increasing the intelligence of the people; therefore, next to education, there is no social interest so thoroughly entitled to the protection and securement which legislation can afford.

A third most important principle is that the value of much of the knowledge to be derived as to the welfare of the people depends upon such extent, reliability and uniformity of information as shall admit of co-study and make the various facts comparable with each other. A city or district may gather correct and important information, but the area or the aggregate of facts collected is not enough to enable us to eliminate errors or arrive at principles. We need also the information which can only be secured by comparing various localities with each other. In order to do this there must be a system such as can only be made available when all the facts can crystallize around a common center. In order that we may understand the significance of local facts, a mapping out of the whole is needed.

These are but a few of many reasons that have led this State, like other States, and the United States, like other governments, to recognize the necessity of State Boards of Health and of State Bureaus of Vital Statistics, which shall consider the relations and needs of each city and precinct so far as they concern adjacent areas, which shall so oversee and adjust as to make local conditions and facts comparable with each other in such wise as to enable us to know the vital condition of all the State, and which shall impart such information as essentially concerns the common thrift and welfare in this regard.

WHAT IS HYGIENE?

The science and art of preservation are, to-day, in a wholly different position from that which they occupied even but a half century ago. The necessities of humanity, and the ills apparent, even before the final article of death, could not but excite some of mankind to an effort to relieve disease and to postpone the significant and affecting change from life to deadness. Those who most feelingly and forcibly made this effort, could not but become observers of the phenomena of sickness as compared with the condition of wellness, and so, from time to time, experience was gained. Such experience of observing minds, and such results of mere empirical trial as manifestly relieved human pain or prolonged human life, early gave rise to a class of men upon whom the title of physician was bestowed.

A most significant title it was and is—for it is the first compliment to, and recognition of man as a student of nature—as the word was derived from the idea of a studying of nature and a bringing forth of truth ; it also denoted knowledge as well as observation. Even the term “medicine,” as derived through another language, has similar philological relation, for it denotes “knowledge by measurement.”

It was a later and a degraded conception that made *physic* and *medicine*, names for the drugs and potations administered, and thus, in the nauseous dose of the compounder, forgot or lost the true and noble significance of the word.

Hygiene, as a name, has a similar nobility of origin. It so far meant that *wisdom* which knows of nature, in order to preserve or cure mankind, that the dispute of mythology as to it, was, whether it was one of the names of Minerva, the Goddess of Wisdom, or a name given to one of her dearest daughters. At any rate, her statue preserved the ancient emblem of wisdom in the one hand, and in the other a cup, out of which the serpent of wisdom sometimes drank. In the early ages, and through all the history of the art of healing, it is apparent that our guild had an idea of nature as the great healer, and of conformity to nature as the great means of preventing human ailments. Ever and anon, the conception is put into most definite forms, as in many of the aphorisms of Hippocrates.

Yet the conceivable was very far from being the actual or the attainable. Until science and art had made marvelous progress in those sciences whose facts and relations have to do with a full knowledge of

the structure and physiology of the human framework and organs on the one hand, and with the forces contributing or essential to the sustentation of human life on the other, it was impossible that hygiene should be anything more than a charming idea, a goddess resting in quiet sleep until the day-dawn was at hand for activity as a result of insight.

What could we know of blood as a vital fluid before Harvey lived, and while arteries were supposed to be the conduits for air?

How could we talk of air before Priestley, at the close of the last century, cleared up the enigma of its action?

How could we know of foods and liquids, as adapted to mankind in their various preparations, until we could derive some indications from chemistry of their constituency and of means for detecting impurities?

It is because there was so much of this preliminary and collateral inquiry to be made that hygiene, in its modern sense, had to abide its time. It is because of this that it is only within the last half century that we could, with any propriety, use the expression "sanitary science." If it is true, as Tyndall not ungenerously says of medicine, that "previous to the discoveries of recent times, medicine was not a science, but a collection of empirical rules," it is still far truer of the science and art of hygiene. But at length light has dawned, the day-spring from on high, from beneath, from around, from within has visited us. Although there is still a vastness like the vastness of the sea to be explored, yet the light is upon the waters and we no longer grope without a pilot.

With this light, as reflected upon us, the following is a brief outline of the line of direction in which our inquiry and our practice is to be:

We are first to study methods for the prevention of disease; second, methods for the limitation of disease. This study presupposes either a thorough knowledge of or an inquiry into the nature, constitution and necessities of the human being, also a thorough inquiry into or knowledge of that part of nature on which the life and vigor of human beings are dependent—sometimes called the *environment*.

Also, a thorough inquiry into and knowledge of departures which have occurred in the case of either, in order to study modes of return

and re-adjustment, or where this is not possible, the best mode of conforming to the changed conditions.

This, in its turn, involves a study (*a*) of the causes of health ; (*b*) of the causes of disease.

Having found the cause of health, how shall we promote it ?

Having found the cause of disease, how shall we intercept and prevent it ?

Having, in all various possible ways and in any or all of these particulars, acquired some knowledge, we then consider and adopt those administrative methods which are necessary to secure the desired result.

While it is not necessary to dwell on each of these sanitary axioms in detail, it is worthy of note that some of them are quite frequently overlooked. Besides the study of methods for the prevention of disease, there is a study of methods of limitation, quite apart from that treatment of disease by remedies which is conceived to be the especial vocation of the physician.

While the inquiry into the nature, constitution and necessities of the human being as found by the study of anatomy, physiology and experience is recognized, it is not appreciated that an equally close study of that part of nature to which he is co-ordinate is equally essential, as well as the needful adaptation of the one to the other.

When, again, we come to deal with the human being as we so often find him, and with his environment as we often find it, we soon see the impossibility of instantaneous return to normal conditions, and so are forced to study that practical sanitation which in part accepts things as we find them, and realizes a new sphere of activity in the line of adjustment and in the limitation of present embarrassments.

The study of the causes of health also takes a wider range than the mere study of anatomy and physiology, or even of surroundings, for it gives consideration to heredity, to mental force, pluck, nerve vitality, &c., and recognizes that health itself is often to be studied, with all the facts of experience, and with all the information to be derived from disease or its progress toward recovery. So, in either aspect, the study of the causes of disease has a range such as has made etiology in general, and epidemiology in particular, an inquiry so broad that its different classes of facts are scanned as are the different constellations in the heavens. Because the study of causes is so fundamental, it has very properly taken the lead in what may be called the

science of hygiene as distinct from the art. Etiology, or the science of causes, is thus one of the very foundations in this great realm of study. So it has been accepted, and the painstaking workers and the inspiring results have never been excelled in the same period of time in any of the experimental researches of modern times.

WATER-SUPPLIES.

In previous reports we have very fully considered the subject of water-supply. In our last report the article on the Passaic water-supply embodies many facts which are worthy of close study in their application to other public supplies in this State. Investigation into the water-supply of the State, carried on during the past year, while revealing on the one hand some excellent and efficient plans and satisfactory results, also shows that sources of supply are too often chosen without skilled foresight; that companies are formed without due protection of the constituency which they are to supply, and that too frequently a majority of the population do not avail themselves of the public source. Greater care is being exercised as to new water-works, so that some of the more recent have been well planned and executed by competent hydraulic engineers. Our State, by the topographical surveys under the direction of our State Geologist, by the report of the State Water Commissioners and by the various facts contained in the reports of the State Board of Health, have left communities without excuse if they fail to secure a pure and abundant supply of drinking-water.

SUPPLY FROM DOMESTIC WELLS.

Notwithstanding the best provisions that can be made by public water-supplies, a large portion of our population will continue to be dependent upon the family well of each particular household. For this reason it cannot be too forcibly impressed that the home well must be kept in a state of purity. It is not enough that a good source of supply has been reached in the ground beneath, or that the well for a long time has furnished good water. All wells less than forty feet in depth represent the drainage of the adjacent soil. If, by the erection of outbuildings, stables, or the introduction of an excessive amount of organic matter into the upper ground within a radius

of 100 feet from the well, there has been contamination of the soil, there is always danger that percolation will not be sufficient to secure the purity of the water that through this upper stratum finds its way to the well. Besides the accumulations on the stone or brick, the decay of wooden curbs used in the steining, the intrusion of roots into the sides and bottom of the well and various accidents by which small animals or other decayable substances get into the well from above, often cause pollution of the water. The well should always be cemented to within two or three feet of the top, and the cover should be impermeable. The rinsing of vessels or the throwing of any slops about the well should be regarded as against the law of life as it is against the law of cleanliness. Health Inspectors should never forget to inquire as to the well and make personal examination of it. Whenever, for any reason, the water seems bad and no other supply is at hand, let it be boiled before drinking. The use for a single day or week may cause a fever or dysentery, or in some minor way disorder the system. Young children are especially susceptible to these influences. Guard your home well as you would guard the dearest interests of your family, for it is now well proven that impure well-water is the cause of many a prolonged or fatal sickness or of chronic ailments.

THE EXAMINATION OF POTABLE WATERS.

The progress of investigation into the causes of diseases is constantly emphasizing the importance of securing pure water-supplies. This does not mean that multitudes do not drink impure waters for long periods of time without any recorded or declared effect. It is indeed wonderful how many trespasses may be made upon the laws of a perfect and unembarrassed vitality without any recorded or immediate effect. There is a law of resistance and restoration as well as a standard of excellence. All that can be said of many departures from the standard is that there is wastage of force without any record of such disturbance of function or change of organ as constitutes disease. If this were always the case, then any inquiry and search after the exact standard of purity would be pure science without apparent utility. But experience has shown us that deviations from certain standards are hazardous, because in certain states of weather or other surroundings, or in certain ages and constitutions, there may be and are serious results. Sometimes these are of a general char-

acter, as where some slight disturbance of the digestive act takes place, and there is slight fever or diarrhoea or other functional disturbance. In other cases there is some specific form of disease, as typhoid fever or epidemic dysentery. As we cannot know all the persons or all the circumstances which invite such manifestations, our only safety is in seeking to know fully what the standard of a pure water-supply is, within what limits there may be harmless variations, and how departures from the proper condition may be detected. For the present we leave out the evidence to be derived from the general practitioner. We also leave for another time the discussion of the significance of chemical tests and determinations. We do not willingly throw suspicion on these, and could give many reasons why the various tests made by chemists come in as parts in making up the evidence. We can give equally good reasons why chemical evidence alone is often pushed to an extreme of conclusions not justified.

Dr. R. Angus Smith, the Inspector for the Examination of Waters under the Rivers Pollution Act of England, 1884, in his last communication says: "Having shown some of my earlier opinions on the analysis of water and the necessity of searching for organisms found therein, it is clear that I have long been conscious of the imperfect nature of chemical analysis as applied to the question." Yet he greatly valued these as a part of the testimony to be secured in summing up the evidence. It is not surprising that when a knowledge of the relation of micro-organisms to some diseases came to be recognized, that the chemists themselves became inquisitive in this new department. Angus Smith was among the pioneers in this field and in insisting upon the advisability of bringing the methods of bacteriologists to bear upon examinations of water. But he was far wiser than some of his imitators. He at once recognized that bacteriology was as distinct from chemistry as is microscopy or biology. He did not fall into the singular error of giving a decided opinion of the quality of a drinking-water based on the number of microphytes he could count. While believing it important to measure the amount of organic life existing in water, he is careful to indicate that our knowledge cannot be interpreted until we come to know the forms or quality of the microphytes, and even their state of activity. "To say," says he, "that a certain class of microbe is present, is not to have a very definite idea." Then again, "these bacteria found in the waters which have been examined are not germs of disease, necessarily; we

are drinking them constantly. There may be conditions in which they cannot be called innocent." He therefore concludes that the time has come when waters must be examined from a point of view of the organisms more than from any other point, but chemists must be very careful of the conclusions to be drawn, very careful also not themselves to be afraid of the existence of organisms, because it is exceedingly probable that there are organisms of a wholesome as well as of an unwholesome character. This probability is now a certainty.

Our desire now is to inquire what progress has been made since the utterances of 1884, in separating the different forms of microphytes, in determining their significance, or, in other words, how far from these we can determine the fitness of water for drinking purposes. Burdon-Sanderson and others have shown that most water contains some bacteria. The experiments of Warden and Frankland, and the several cautions given by Klein, show the many sources of error as to source and numbers, and even when the number is found, how little is the significance without many other facts. Dr. Meade-Bolton, of the hygienic institution at Gottingen, who has devoted much time to these examinations, finds that microbes are found in every kind of water. He concludes that the chemical condition of the water possesses no other importance than that of raising suspicion of the presence of pathogenic bacteria. The determination of the kind of bacterium is of higher importance in bacteriological analysis than the enumeration of the total quantity of bacteria contained in the water under examination. When we consider that in no drinking-waters hitherto analyzed, have pathogenic bacteria been found except where they had been put by the experimenter, we see that we as yet have from this source no guide as to purity. For two years or more, Dr. Percy Frankland has made systematic bacteriological examinations of the Metropolitan water-supply of London, and has become a leading authority on the value of this kind of examination. He says "the more sanguine investigators were doubtless of opinion that these researches into the nature of the micro-organisms present in natural waters, would readily lead to the discovery of forms possessing pathogenic properties in some waters, and that upon the absence or presence of such disease-producing organisms, it would be possible to form an opinion as to the fitness or unfitness of water for dietetic purposes. There are many persons who still regard such a discovery as the ultimate scope of the bacteriological examination of water; but a little

reflection will at once show how small is the interest or value attaching to such an investigation." But he does attach great value to the demonstration of the passage of any living organism, pathogenic or harmless, from a center of contamination into a source of drinking-water. He thus believes the identification of various forms common to both, will be valuable in determining the source of contamination. Also that we shall be able to test processes of filtering by the results they show in diminishing the number, either by their detention, or by removing the material on which they thrive. Even these views are opposed by Bischof, as we do not yet know the value of the presence of some of these forms. There is some significance in the fact stated by Bolton, that there is a diminution of numbers after much drawing from subterranean sources, but this he attributes mostly to the filtration.

From the behavior of known pathogenic bacteria, introduced into water, we get some valuable facts as to their action and destruction, but not such as yet inform us anything as to the conditions of natural waters. Even in our own country, these views have been emphasized by the experiments of Theobald Smith, Ph.B., M.D., in the Agricultural Laboratory at Washington. (See paper, *Med. News*, October 9th, 1886.) "The signification of the number and kind of bacteria still remains to be determined." He says "statistics collected from various cities in Germany and Austria, do not indicate the perfect concordance between biological analysis and former estimation of quality, which those would wish to see who have looked upon this method as more satisfactory than chemical analysis."

A knowledge of the various species of bacteria is a safer guide than their number, in estimating the quality of water. These facts will serve to show that we as yet have no occasion to frighten the public out of propriety, by finding 5,000 microbes in a drop, as has been the case in fairly good water in London. We have no doubt that we are in the region of valuable facts, and that valuable indications will yet appear. We hope to see the time when the facts of the clinician, the biologist and the chemist can so be brought together and compared as to give valuable results. Even now, from these, there are reasons for cautions and precautions. But on the other hand, we are willing to use our facts for what they are at present worth, and not to alarm beyond what is just and right.

ORGANISMS OTHER THAN BACTERIA FOUND IN POTABLE WATER
WHICH MAY AFFECT IT.*Plants and Animals.*

It has often happened that waters which are for a time satisfactory, come to have sudden changes in taste and smell as well as in organic purity. This may be owing to changes in the origin of supply or in the reservoir and apparatus of distribution. Various animals and plants may choose locality in the storage-places of water. Some facts as to this were noted in our seventh report (1883), pp. 156–188, by Prof. Leeds. A fresh and condensed statement is made as to these changes and some remedies by G. H. Parker, the biologist of the Massachusetts State Board of Health, in its nineteenth report (1887). We quote as follows from the summary as given by the Secretary :

“Three classes of plants are found in our ponds and reservoirs. First, those which are fixed in the basins, such as the common pond weeds and a few filamentous algæ. Second, those which are suspended in the water, but do not readily decompose, including the common green algæ (*desmids*, *diatoms*, &c.) and duck-weeds. Third, those which are suspended in the water and readily decompose, the blue-green algæ (*Cælosphaerium*, *Anabaena* and *Clathrocystis*).

“Plants firmly fixed in streams and basins are harmful mainly in affording a lodging-place for the development of plants belonging to the groups two and three above noted. In basins having much fluctuation of level, plants of the first group may injure the water by their death and consequent decay.

“The floating plants of the second group are injurious, since, after a long carriage through a closed conduit or in continued hot weather, they die and decompose. In Boston water, taken from a tap, they are usually dead ; in Cambridge they are usually alive in the water taken in the same way, and offend only the sense of sight.

“The members of the third class multiply very rapidly, and secrete a jelly, which, together with the plant, readily undergoes decomposition. These plants usually decay in the basins, and are represented in the water drawn from the taps only by a few fragments.

“Of animals, two classes may be mentioned: the fixed or sessile forms, and the free-swimming. Of the latter, the *entomostraca* are the only troublesome forms, and these mainly in the hot weather, when the rate of reproduction is very high. Of the sessile animals two are noteworthy, the fresh-water sponge and the polyzoa. The latter usually encrust the gates and open ends of pipes. One gelatinous form lives in the ponds—sometimes free, sometimes attached.

"The comparative small number of the polyzoa and their hardiness render them generally less important than some of the other organisms. The sponges are undoubtedly the most troublesome of the animals found in water-supplies. They readily decompose and strongly taint the water. They are now conspicuously absent in the sources of Boston's water-supply.

"Some of the lines upon which relief from the nuisance occasioned by these organisms may be sought are the following: Fixed plants can be cleared from ponds by the usual methods of raking. Improvements of the ponds by deepening and removing the loam will probably do much to check the growth of plants in groups two and three.

"In Mr. Parker's preliminary report will be found some observations upon the changes undergone by water from one locality, under the different conditions of storage in a filter gallery, in an open and in a covered reservoir. These observations have a great practical value, and demonstrate the value of covered reservoirs as a protection against the vegetable life which seems to be the ordinary source of the disagreeable tastes and smells so common in our ponds and reservoirs."

LAUNDRY AND DISH-WATER SLOPS.

While there is a general admission that organic animal matters in a state of decay are injurious, it is not unusual to find it asserted that ordinary kitchen and laundry slops, as discharged into small brooks, are not injurious. This question has come up in several of our towns where some small brook or ditch, almost dry during the summer, is made to receive the slop-water from many houses. While it is admitted that in some states of the atmosphere it causes odor and discomfort (which of itself should condemn the practice), it is claimed that no harm to health can follow. Some time since, the Secretary was called to a nuisance in Clark township, Union county, where complaint had been made of a nuisance caused by cesspools in which no urine or fecal matter was received. It was noticeable that what is known as the sewer-smell was present. In fact it is quite certain that the sewer-smell so familiar to all Health Inspectors is not caused by human or animal excreta, but more by the greases and gases of slop and laundry decomposition. In order to have some chemical evidence upon the subject, Prof. H. B. Cornwall, of Princeton, was asked to make analyses of slop-water such as could be secured in the neighborhood. The following is the result:

TESTS ON LAUNDRY AND DISH-WATER SLOPS.

“Slops taken from my own and a neighbor’s house were kept a few days and then tested for *free* and *albuminoid ammonia*.

	—Per 100,000—	
	Free Am.	Alb. Am.
Laundry slops (family of six persons).....	9.7	6.08
Dish-water—dinner plates, &c. (family of six persons)	6.4	1.86

“A drinking-water containing 0.015 of albuminoid ammonia per 100,000 is ordinarily to be condemned as containing an unsafe proportion of organic matter, regardless of any specific disease germs, &c., possibly present. *Free ammonia* above 0.005 per 100,000 is regarded as indicating, in general, an unsafe contamination by organic matter. It is evident that the above slops would seriously contaminate any source of drinking-water, unless very largely diluted. After standing a few days they both acquired a very offensive odor, and evidently contained much putrefying matter.

“The analysis of such highly impure compounds is quite troublesome, owing to the necessity of several trials to fix the proper dilution with pure water for making the actual analysis.”

It will be seen that these results confirm the testimony of the senses and of experience. The Secretary, several years since, in taking up pipe on his own premises, into which only slop-water and laundry-water passed, found the pipes choked, and sent samples of the accumulation to Prof. Austen, of New Brunswick. The analysis showed the foul greases of soaps returned to their original state, gases of decomposition and various forms of debris, which proved the compounds to be even worse than the usual excreta. My own experience as to very many cases of this kind is that the fouled waters of kitchens and of the laundry are as hazardous as water fouled with animal excretions, with the exception that they are not so likely to contain the specific poison of such a disease as typhoid fever. But when it is remembered that laundry work often includes clothing soiled with excreta, and that all slop-water quickly passes into stenchy decompositions, it must be claimed that all such liquids are to be regarded as dangerous to health.

SEWERS AND SEWERAGE.

In the last report an exhibit was made of four prominent systems of sewers and sewage-disposal, in order that some comparisons might be made between them and with any other methods. It is more and more evident that several systems have merits, and that generally preference is to be determined by the locality, the size of the city, and various other considerations.

Thus, whether the storm-water shall enter the sewer depends much upon whether or not it is well carried off by the contour of the surface, upon the character of the soil, &c. Whether the sewage shall discharge into a river must depend much upon whether the stream is rapid or sluggish, whether it is near the sea, upon the amount of sewage, &c. Whether land shall be used for filtration, or whether in substitution for it, or in addition to it, mechanical and chemical methods of subsidence and clarification shall be used, is also a relative question. As to all these, it is well to know that they are fully understood and properly weighed by all competent engineers. There is no more divergence of opinion than there is in any other department of scientific or practical planning and laboring. Indeed, it can be said that all the details of the removal of waste liquids are now so well understood, and the plans are so feasible and the outlay so much less than formerly, that there is no excuse for our continuing to live amid the waste and decaying products of civilization.

PROGRESS IN THIS STATE.

During the past year, the progress in this State has been very marked. Trenton as a large city, and Mount Holly as a smaller one, have both illustrated the feasibility of different methods. Plainfield has had a full report on a projected system of sewerage, and several other cities or towns have either begun or are preparing to carry forward a sewerage system.

MORE RECENT IMPROVEMENTS.

The two most important facts of more recent date, as to dealing with sewage as with polluted water, are—first, what has been found

as to the disposal of sewage in the ground; and second, the effect of methods of subsidence and purification.

I. Formerly it was supposed that when water was agitated in, or exposed to air, or when distributed over land for filtration, that the chief change wrought, depended on the oxidizing effect of the air. Robert Warington, chemist of the Royal Agricultural Society, England, showed that much of the change is due to living organisms, by which nitrification is produced in soil and in water. This life does not act, as a rule, over two feet from the surface. In a clayey subsoil, very little of this bacterial life is found under two feet of the surface. His various experiments have been confirmed by Schloesing, of France, and Frankland, of England. The chief lesson is, that for all land or ground filtration and purification, we must depend upon the upper ground, and that decaying material which we desire to get clear of by natural processes, must be left very near the surface. Also that it must be loose ground, since the purification is a process of oxidation, of which the products are carbonic and nitric acids.

II. As to methods of purification by subsidence and chemicals, while it was admitted that much organic matter was removed, it was contended that no method would remove the minute forms of microphytic life, *i. e.*, micro-organisms. Facts now, however, show that they are removed. If not directly, they are deprived of their food or pabulum, and so cannot remain. Dr. Percy F. Frankland, in a large series of experiments with the London water-supply (see "Water Purification, its Biological and Chemical Basis," Pro. Ins. Civil Engineers, Vol. LXXXV., London, 1886, and various papers in *London Sanitary Record* since), shows that filtration does remove a large percentage of bacteria. The same is shown as to chemical precipitation. The same has been shown at the Berlin water-works, where the efficiency of the filter-beds is determined by the percentage of bacteria which they will remove. Experiments at the Lawrence Experimental Station, Mass., have confirmed these views.

Our chief lack at present, is, that we cannot so classify bacteria as to know which are harmful and which are useful, or if we could, do not know how to remove the one and leave the other. But the fact that the water is improved by the wholesale removal, is a practical one, applying both to water-supply and to sewage that is to go into streams not large and not favorable to its complete disposal.

RESULTS OF THESE VIEWS.

In view of all these facts, the system of land filtration has been rendered still more effective. Where land cannot be had, on a similar principle, subsidence and chemical treatment are made available.

Where sufficient land cannot be had, the two methods are made to supplement each other, the sewage being treated before its transfer to the soil. As a fresh illustration of the value of *Chemical Treatment of Sewage*, we abstract as follows :

“MM. P. Charstaing and E. Burillot have contributed to the Proceedings of the Académie des Sciences a carefully-prepared account of the results obtained in Brussels by the method of rendering sewage innocuous by treatment with chemical reagents. In the course of their paper they remark that for the purpose in view there are two methods in actual use : ‘1. The method of irrigation, or the purification of sewage by means of the soil and cultivation—a method which is widely advocated and available when command can be had of large expanses of land adapted to this use, and when the water which has to be purified is not highly charged with putrescible matter. 2. Chemical methods, which have for some years past fallen into great disrepute, but which, in consequence of advances recently made and still possible in chemical science, demand a careful consideration.’

“They continue : ‘The first method has been much studied, we may say studied exclusively, in France. This very circumstance has led us to examine the value of the chemical methods, believing as we do that in the public interest no single plan which may contribute to the public health ought to be overlooked or neglected. Many methods of effecting the chemical purification of effluent sewage-water have been proposed. The effluent water of the city of Brussels has been analyzed with a view to determining (1) its composition, and (2) the alterations produced in its composition by chemical treatment with a view to its purification. The analysis gives the following result :

“SEWAGE-WATER OF THE CITY OF BRUSSELS.

	Taken from the mouth of the collectors.		Purified.
Appearance.....		Turbid	Limpid
Odor.....		Nauseous and ammoniacal	None
Chemical reaction.....		Very alkaline	Slightly acid
Dry residue per litre.....		5.367 grammes	0.697 gramme
Mineral matter.....		3.826 "	0.587 "
Organic matter, &c.....		1.581 "	0.110 "
Suspended matter.....		1.000 "	None
		0.560 "	None
		1.510 "	0.011 gramme
		0.082 "	None
		0.082 "	0.010 gramme
		0.882 "	None
		2.484 "	0.021 gramme
Composition of the organic matter dissolved in 1 litre of water.....	Nitrogenous.. { Ammoniacal... { Free ammonia... Nitrates..... { Ammonia salts..... Organic..... { Crystalloid..... Albuminoid.....	Not determined	Not determined
		0.240 gramme	0.080 gramme
	Total nitrogenous matters.....	0.080 "	0.005 "
	Organic carbon.....	None	0.300 "
	Alumina.....	0.050 gramme	0.080 "
	Sesquioxide of iron.....	0.100 "	0.060 "
	Lime.....	1.970 "	0.087 "
	Magnesia.....	0.006 "	0.004 "
	Chloride of sodium.....	0.126 "	0.063 "
	Potash.....	1.844 "	0.068 "
	Silica.....	786.5 cub. centim.	None
	Phosphoric acid.....	0.0068 gramme	None
	Sulphuric acid (SO ₄ H ₂)—in combination.....	4.5 cub. centim.	None
	Free ammonia.....	None	5.00 centimetres
	Sulphuric acid... { By weight.....	0.060 gramme	None
	{ By volume.....	Not determined	None
	Oxygen..... { Nitrogen (organic).....		None
		Carbon.....	
		Oxygen.....	
		Hydrogen.....	
	Organic matter... { Lime.....		
		Alumina...	
		Iron.....	
	Mineral matter... { Phosphoric acid.....	0.351 gramme	None
			None
		0.120 "	

“ ‘1. *Organic matter*.—It will be seen from the preceding analysis that the effluent water upon the method of carrying away the whole of the sewage becomes very highly charged with organic matters, among which nitrogenous products predominate. The proportion of substances dissolved is about 5.35 grammes per litre in the effluent water of Brussels, whereas it varies in Paris from 2.59 in the Asnières main to 3.50 grammes in the Saint Denis main. There is a still greater difference in the proportion of nitrogen, for whereas the water in the Brussels main contains 2.434 kilogrammes per cubic metre of nitrogen in solution, and 60 grammes in the form of suspended matter, that of the Paris outfalls does not contain more than from 44 grammes at Asnières to 140 grammes at Saint Denis of nitrogen in all forms. Lastly, the weight of putrescible organic matter is about 2 kilogrammes per cubic metre in the water of the Brussels outfalls, and does not exceed 910 grammes in that of Paris. The effluent water at Brussels, after being purified by chemical processes, is limpid and inodorous; its composition, no doubt, shows that it would not be fit for domestic use, but it is so far pure that if turned into a river it could not give rise to any infection, and, furthermore, it contains a sufficient quantity of oxygen in solution to allow fish and vegetable life of high orders to develop in it. Is the purification by the chemical process more perfect than purification in the soil? Reference to publications made upon the subject of purification in the soil shows that water so treated after separation from solid sewage retains from $\frac{1}{4}$ to $\frac{2}{4}$ of its original nitrogen. The foregoing analyses show that the whole sewage treated chemically retains about $\frac{1}{16}$ of its original nitrogen, but what would this same water (undivided from solid sewage) retain after treatment in the soil?

“ ‘2. *Mineral matters*.—The mineral matters held in solution in the water examined are of less importance than the organic bodies; it is nevertheless worthy of remark that 1 cubic metre of effluent water (in the whole sewage system) can furnish about 2 kilogrammes of potash and 100 grammes of phosphoric acid, whereas the effluent water of Paris only contains about 80 grammes at most of potash and 40 grammes of phosphoric acid.

“ ‘3. *Gas in solution*.—The presence of ammonia in a free state, or held in feeble combination by carbonic acid, is a matter of great importance; sewage-water spread upon the land may, under certain conditions, give up this gas to the air, and 1 cubic metre of sewage may thus set free 736 litres of ammoniacal gas; moreover, volatile phosphoric compounds which are highly poisonous may be given off by this water, to say nothing of sulphuretted hydrogen and other nauseous and unwholesome emanations. In the chemical method these dangers cannot arise if proper precautions are adopted in the arrangement of the apparatus.’

“ The authors then sum up their inquiry in the following results:

“ ‘It thus appears to be clearly established: 1. That the purifica-

tion of sewage by chemical means is perfectly practicable. 2. That it can be applied continuously and without the production of unwholesome emanations. 3. That the employment for agricultural purposes of the nitrogen, potash and phosphoric acid contained in the sewage can by this method be easily effected.' ”

Speaking, therefore, with confidence as to the ability of our engineers, chemists and sanitarians to direct communities as to proper methods of construction of sewers and the disposal of sewage, we desire to emphasize the following points :

I. No system should be adopted on the advisement of a non-expert committee, however intelligent, but some competent person should be held responsible for the choice of a plan adapted to the locality and to the population.

II. There is need of skilled supervision in carrying out all details of construction, as well as in all joinings to the system, made from dwellings, factories, &c. Contractors, householders and plumbers, with all their excellent intent, cannot be trusted to get all things just right.

III. There is need of thorough administration and sanitary inspection.

If all of our cities, towns and villages will thus act, diminished sickness and death-rate will repay expenses if, as to these, too, proper oversight is exercised.

SUMMER HOTELS AND FIRE-ESCAPES.

The burning of one of our summer hotels, at Point Pleasant, and the cremation of one of the guests, may well call our attention anew to a subject noted in our fifth report, 1881, p. 25. The burning of the Parry House, at Beach Haven, and of the Mansion House, at Long Branch, may well be recalled. Any one familiar with the way summer hotels are generally constructed, and, indeed, with most of the house-construction at sea-side resorts, should realize that the buildings are extra-hazardous. The law as to fire-escapes should be rigidly enforced. See Chapter CX., Laws of 1882 ; Chapter XLI., Laws of 1886, and Chapter CXLIX., Laws of 1888. The first two laws should be made to apply to two-story buildings, although the general terms of the law of 1888 would probably apply it to all boarding-places. Many of the buildings, not only in our summer resorts, but in our cities, are very unsafe. Guests should examine as to fire-escapes, and Local Boards should see to it that the law is enforced.

VACCINATION AND RE-VACCINATION.

The subject is ever old and ever new—ever old, because for over a century the evidence of its necessity and potency as the preventive of a terrible disease has been shown—ever new, because so many neglect the boon of this great protection. In the sixth report, 1882, we furnished papers and reports from some of the best authorities, which really covered all that was then known upon the subject.

So thorough had been the observations and investigations up to that time, that very little that is new can be added. But there is need of line upon line, precept upon precept, as to a matter that so seriously affects not only individuals, but the welfare of large populations.

The chief advance in our knowledge has been by way of accumulation of evidence. By reason of some opposition had in Great Britain to a law of compulsory vaccination, and of the existence of a society which regards this as an invasion of personal right, physicians and sanitarians have been led still more closely to collect and analyze the facts collected from various nationalities. Such a book as "Vaccine and Variola," Churchill, London, 1887, or "The Truth about Vaccination," of Ernest Hart, London, shows how thoroughly the whole subject has been investigated and how fully the value of vaccination has been established. The former is especially valuable for its bibliography.

The two questions of more recent prominence are, From whence shall the vaccine lymph be derived? and, How far is re-vaccination necessary? As to the former, it can confidently be said that bovine lymph has fully established its value and, to most minds, its superiority. Some prefer its general use after having passed through the arms of one or two healthy subjects, while others prefer the calf lymph taken directly. There are now reliable sources of supply, as referred to in our circular on Small-pox and other Communicable Diseases.

It is not admitted that this has to be used to the exclusion of all other lymph. Dr. Snow, of Providence, and others have shown how far what is known as the Jennerian lymph is still reliable, and how groundless are the fears as to the conveyance of any human disease if only the plainest precautions are taken. At any rate, there is now no reason why the family physician, who is trusted as to the character

of his medicines and his judgment, should not in this also be trusted. There is no reason why every child in America should not be vaccinated during the first year of its life, unless some possible exception is advised by the medical attendant. As to re-vaccination and its necessity, there has been some change of professional opinion. It is now recognized more than formerly that for various reasons there may be a failure of constancy in the protective power of vaccination. Some modifications are found to arise by reason of too small a number of pustules, of the condition of the person at the time the operation is performed, and by reason of the exhaustion of the effect after the lapse of a few years, for reasons that we do not understand. Strict methods have shown that there are very many unskillful vaccinators, so that in consequence of imperfect vaccinators very many have been nominally vaccinated who are not protected.

Dr. Buchanan, of the Local Government Board, Great Britain, has recently issued a memorandum on the subject of re-vaccination, which so far expresses the correct view that we quote from it as follows :

“Evidence of the additional protection against small-pox given by a re-vaccination can be found abundantly by any one who chooses to seek for it. It can be got from the experience of re-vaccinated communities living in the midst of communities not re-vaccinated, as in the case of the permanent officials of the postal-service living in London ; or it can be got from the experience of nations, differing in their small-pox death-rates as their laws for re-vaccination differ ; witness the contrast between the German and Austrian rates of small-pox mortality since the time when Germany, but not Austria, enforced re-vaccination upon children of school ages. Or evidence to the same effect is to be had by observing the immunity from small-pox, for year after year, secured to nurses in small-pox hospitals by re-vaccinating them before entering on their service. This last is perhaps the most obvious of all such examples ; and in the few instances where there has seemed to be exception to the rule of their immunity, it has almost always turned out that the requisite re-vaccination had been by some chance omitted.

“The re-vaccination which is proper to be done for every child ought to be a matter of regular system ; done as regularly, it were to be wished, as primary vaccinations are done for infants. There should be no waiting until an alarm about small-pox is raised. The importance of these considerations will be obvious to any one who considers the conditions for the proper performance of re-vaccination. The lymph has to be obtained from cases of primary vaccination ; it must not be taken from cases of re-vaccination ; it ought to be used in the

freshest possible state, and, whenever practicable, direct from the primary vaccine vesicle.

* * * * *

“Medical and sanitary officers and the medical profession generally are therefore invited to urge upon parents and guardians the importance of having their children re-vaccinated at the age of twelve years or thereabouts, and to urge upon all persons beyond this age who have not yet been successfully re-vaccinated the duty of obtaining for themselves the additional protection which may be had by this means.”

It has been practically applied in Prussia in the case of the army, which has lost but one soldier by small-pox in thirteen years. The English law recognizes the need of re-vaccination after twelve years of age.

The memorandum states that with the best lymph 96 per cent. of re-vaccination ought to be successful. This is higher than with us, since we have been much in advance of Great Britain in the preservation and use of bovine lymph, and have been equally skillful in the operation. Yet there are many failures in vaccination and re-vaccination which ought not to be.

We have not and do not seek a law of compulsory vaccination, but with the power given to boards of education and school trustees under our laws, no children should be in any of our public schools until able to show a certificate of vaccination, and re-vaccination may be required where deemed necessary. (See Chapter LXVIII., Laws of 1887, or Circular LX., page 19, Sections 22 and 23.)

Physicians, too, in their common duty as citizens should, by the use of the circulars of this Board, or by other means, strive to secure the protection of vaccination to the families in their charge. Local Boards of Health should make this an especial part of their duty, and from time to time distribute brief circulars as to it. It is bad in principle and in policy to wait for an epidemic in order to secure immunity. This of all others is the one disease that never ought to occur. Under the enforcement of military orders often not a single case occurs, and similar experiences are numerous to the degree in which communities avail themselves of this protection.

DISINFECTION.

The value and the modes of use of the various disinfectants have been sufficiently presented by this Board in recent reports, as well as

Circulars XLIV. and LXIV. of this Board. There is still need that attention be drawn to two points :

I. The imperfection of their use. We have so many "dabs" at sanitation. A physician tells the family to disinfect and what material to get. He has no time to oversee the mode of use, and in fact in the practical details of method generally does not know and cannot be expected to know. How many physicians know how properly to fumigate a house, and perform all the details of cleansing after an epidemic? How many can tell just how, and how much of, a disinfectant has been used in the last case of typhoid fever? Now, all this proves that generally the execution of the work should be put in charge of some competent person. In cities the Health Inspector should usually be sent for, either that he may do the work, give item directions as to it, or see that it is properly done.

II. The second error is in relying too much on disinfection. It can never take the place of systematic and enforced isolation in some diseases. It cannot take the place of prevalent and persistent cleanliness. Most of all, the one great reliance is *pure air*, and there can be no substitute.

We direct attention to a very suggestive article read before the American Climatological Association, September 20th, 1888, by Prof. I. T. Whittaker, M.D., of Cincinnati, on "Conditions which Tend to Render the Atmosphere of a Locality Aseptic."

He ventures the assertion, and goes far towards proving it, that small-pox, scarlet fever, measles, typhus fever and relapsing fever, aside from accidental direct contact with cases, are not ever contracted in the open air. We can imagine an exception in some close street or alley of a city, but the fact has far less exceptions than generally imagined. The garment that has been shaken out of doors does not hide contagion. Pure air is the enemy of such contagions as come from within, as most of them do. The infected house must be turned inside out, as to all its movables, and practically so aired as to be out of doors. Add to this the following directions, and no disease would be likely to become epidemic.

Let us describe a place selected for the habitation of man and erect a house which is to remain, as far as possible, aseptic :

"It will stand facing the sun on a dry soil in a wide, clean, amply-sewered, substantially-paved street, over a deep, thoroughly-ventilated and lighted cellar. The floor of the cellar will be cemented, the walls

and ceiling plastered and thickly whitewashed with lime every year, that the house may not act as a chimney to draw up into its chambers micro-organisms from the earth. Doors and windows, some of which extend from floor to ceiling, will be as abundant as circumstances permit, and will be adjusted to secure, as much as may be, thorough currents of air. The outside walls, if of wood or brick, will be kept thickly painted, not to shut out penetrating air, but for the sake of dryness. All inside walls will be plastered smooth, painted, and, however unæsthetic, varnished. Mantels will be of marble, slate, iron, or, if of wood, plain, and whether natural, painted or stained, varnished. Interior woodwork, including floors, will all show plain surfaces and be likewise treated. Movable rugs, which can be shaken daily in the open air—not at doors or out of windows, where dust is blown back into rooms—will cover the floors. White linen shades, which will soon show the necessity of washing, will protect the windows. All furniture will be plain, with cane seats, perhaps, but without upholstery. Mattresses will be covered with oiled silk; blankets, sheets and spreads, no comforts or quilts, will constitute the bedding. Of plumbing, there shall be as little as is necessary, and all there is shall be exposed, as is the practice now. The inhabited rooms shall be heated only with open fires, the cellar and halls by radiated heat, or, better, by hot-air furnace, which shall take its fresh air from above the top of the house and not from the cellar itself, or the surface of the earth, where micro-organisms most abound. There will be ‘house-cleaning’ twice a year. Put into this house industrious, intelligent and informed men and women—absolutely essential conditions—and as much will be done as at present may be done to prevent the dissemination from it of contagious disease, when an inmate brings it home from a septic house, hospital, sleeping-car, school-room, theater, church, &c.”

AIMS OF HEALTH BOARDS.

While there is so much ground for congratulation, in view of the sanitary progress made by our Local Boards, let us remember that we fall very far short, in actual administration, of many of the cities of our own country, and of many in foreign countries, especially in England.

I. There is generally not enough money provided for an economic and successful sanitary administration.

II. There is need of more thorough system and greater promptness in removing garbage, filth and all various decomposable matters.

III. While administration should be on the alert for the removal of nuisances, it should do far more for their prevention.

IV. House-to-house inspection is not frequently enough, or systematically enough done, and does not lead always to action such as is demanded.

V. Inspectors are not trained properly in their duties, and too often make only verbal reports.

VI. Vaccination, circumspection over articles offered for sale, plumbing and various other matters, are not enough provided for.

VII. Cities of over 20,000 inhabitants should always have public baths, a public apparatus for disinfecting clothing, a contagious-disease hospital, prompt reports of cases of contagious disease, a garbage destructor, an ambulance, a supply of disinfectants and all the various conveniences now recognized as needed for the protection of the public health. While we must move only so far in advance of public opinion as to be within influential distance of it, we must see to it that we educate the people, both by precept and by showing the actual results of efficient sanitary practice.

As to vital statistics, important as they are, they are not utilized as they should be, unless consulted each week, and compared from month to month and year to year, in order to indicate the abiding-places of disease, so that local causes may be discovered and removed.

SANITARY QUESTIONS AND ANSWERS.

In the tenth report of the Board, 1886, pp. 46–58, a series of questions and answers was given, which has been found very useful by Health Boards and Inspectors. They afford ready direction to those who are not fully educated in the details of sanitary administration. We here add to these a few more, which will be found convenient for reference.

“Q. If asked to advise upon the proposed drainage of a town, what would be the chief points to which you would direct your attention? Explain what would be the conditions which would limit your choice of outfall.

“A. Its situation with regard to a suitable outfall, its population, manufactures, water-supply and annual rainfall, its geographical features, having regard to gravitation, and desirability of adapting separate system and intercepting sewers, geological features, as to construction of sewers and method of treatment of sewage, and ventilation.

“The conditions limiting choice of outfall would be the want of

proper discharge for effluent—unsuitability of land rendering it impossible to discharge an effluent of the required standard; the position of the town might be such as to render it difficult to obtain an outfall without expensive pumping machinery, and the possibility of having to enter into the district of another local authority, and the violent opposition always given to the establishment of sewage outfall works, and some other points.

“Q. What is meant by the separate system of sewerage? In what circumstances would you advise it?

“A. The separate system of sewerage is that by which the storm or rain-water is carried off by a separate drain from that used for the sewage proper. Its adoption is advisable in hilly towns which are very subject to heavy storms, and in low-lying towns with much sub-soil-water (as the drain could be utilized for draining the site on which the town is built), also where the ultimate treatment of the sewage is to be by mechanical means or irrigation, it is mostly advantageous to exclude as much water as possible, there generally being found as much liquid in the sewage as is requisite for carrying purposes, and any addition thereto only adds to the expense and detracts from the efficiency of the purification. There is a great deal to be said on both sides of the question, which have each their advocates; for instance, where the separate system obtains, there may be often a want of water for flushing, and after storms a very large quantity of objectionable matter may be carried into the storm-water drain, whose possible outfall being in a stream or brook, would carry the contaminating media thereto, to the common danger of persons or cattle using the water.

“Q. How is water filtered on a large scale for town supply?

“A. Water for the supply of large towns is filtered by being passed through mechanical filters constructed somewhat as follows: The water is sometimes first passed through a subsiding tank, where the solids are allowed to settle, is then discharged into a filtering reservoir; the bottom layer of the filtering medium consists of clean gravel gauged to about the size of a walnut, from 1 foot to 1 foot 3 inches deep; the second layer, gravel broken to a gauge of the size of horse beans, about 6 inches deep; the third layer, gravel broken to a gauge the size of peas, same depth as before, and fourthly, a layer of gravel, 6 inches deep, size of buckshot. This is topped with from 2 feet to 3 feet of clean sand, and upon this surface the water is distributed, whence it percolates through the sand and gravel into brick collecting drains, and thence into the pure-water reservoir or pump-wells. To efficiently filter the water, it should not be allowed to pass the filter quicker than at the rate of about fifty gallons per superficial foot of area of sand surface in twenty-four hours, and require frequent cleans-

ing, which is done by removing a small quantity of the top layer of sand, which is thoroughly washed and again used after exposure to atmospheric influences.

“Q. The site on which a town-house is to be built is very damp, and is to be underdrained by land drains. Explain in detail how this should be done?

“A. To underdrain a damp site it is requisite to excavate a number of trenches at such depth as circumstances may require, in which should be carefully and truly laid a series of unglazed pottery field-pipes having butt joints. These pipes should be covered with a thickness of clean gravel, admitting the percolation of subsoil-water into the pipes. In some cases it would also be requisite to carry a drain entirely around the outside of the building. The discharge from these drains (if in the country) might be into a water-course, if in town they should be first led into a trapped disconnecting chamber or gully, discharging into the house drain or public sewer. It is imperative that ample means of ventilation should be provided for these land drains, the upper ends of which should be in communication with the open air, thus admitting a free current to flow from the intercepting tank up through the drains to their higher ends. This intercepting chamber should have the character of a ventilated man-hole sufficiently large to admit of thorough inspection. After the drains are laid and connected the whole ground should be thoroughly consolidated and then covered with not less than 6 inches of good Portland cement concrete, grouted to a smooth surface, or, better still, asphalted. If this work be well done there need be no fear of damp rising.

“NOTE.—There should be a thoroughly-ventilated space between the upper surface of the asphalt and the under side of basement floor, if of timber.

“Q. What precautions should be taken in basements of houses to prevent the walls being affected by damp? If the walls in an existing house show signs of damp, what means would you take to remedy the same?

“A. A thoroughly efficient damp-proof course—such as Doulton’s glazed damp-proof course—or other impervious material should be inserted in the wall for its full thickness *above the level of the adjacent ground*; and if below the level of the street an area should be formed along such part as lies below the level, which area should be properly drained, or if this is not possible the wall may be built hollow, with a damp-proof course both at the top and bottom of the cavity, which must be drained so as to admit any percolation to drain away. If the damp was caused by rain percolation, coat the outside walls with Portland cement; but if the bricks be very porous rebuild with hol-

low walls, due provision being made for insertion of efficient damp courses. A great deal of damp is caused by want of ventilation.

“Q. What are the chief points to be attended to in ventilating rooms? Why is there so often a draught near windows, even when they are well constructed?

“A. That the external air be admitted at such a velocity as to avoid draught, and yet in such a quantity as to admit of an entire change of air three times within the hour, allowing about 1,200 cubic feet per hour per adult. It is incorrect to suppose a draught to exist in this case. The feeling of draught or cold is caused by the cooling of the body on the side next the window, due to radiation; the truth of which may be tested by drawing a curtain across the window, when the radiation will be checked and the feeling of draught disappear.

“Q. Describe some simple methods of ventilation which you would recommend for dwelling-rooms. Make a sketch showing a room suitable for fifteen adults.

“A. The most simple method of ventilation in a room is by the insertion of a strip of wood about three inches deep (fitting the whole width of the window) between the sill and the bottom rail of the sash. This admits of a corresponding opening between the meeting rails of the top and bottom sash, thus allowing a constant upward current of air and preventing any down-draught. This method is both cheap and effective, as it requires only a strip of wood, which can be removed at pleasure.

“Moore’s Louvre and circular glass ventilators for windows are useful, easily fitted, and can be opened or shut at will.

“Another method is by the insertion of a ‘Sheringham’ ventilator, which, by its construction, spreads the air over the ceiling; the vitiated air being imperceptibly drawn towards the fire-place. The valve of this ventilator, being hinged at the bottom, remains open; but by a small cord attachment can be altered to any angle required, thus regulating the flow of air.

“Also by the use of ‘Boyle’s’ patent mica flap (outlet) ventilators inserted in the chimney breast, discharging the vitiated air into the smoke flue. The valves, being composed of mica, are so light that the slightest current of air opens them. Immediately a down-draught occurs the valves close, thus preventing smoke entering the room.

“Q. If there is reason to suspect that sewer gas is escaping into a house, in what way would you proceed to examine the drains? And what points would you look to?

“A. First ascertain whether the house-drain is properly (*i. e.* entirely) disconnected from the sewer. Then if ventilation exists,

whereby a column of fresh air is continually passing through the drain. Then if any defect in the drain itself, by bad laying or defective jointing, &c. And, lastly, if any defective sanitary arrangements existed within the house. To discover these defects it would be requisite to open out the drain between the house and sewer, as near house as possible. At this point introduce a smoke rocket, or asphyxiator, injecting smoke, the dense column of which, ascending the drain and all its ramifications, would at once show by its presence where any leakage occurred, and so localize the defect.

“There is another way by using a strong-smelling liquid, which, being started at the highest part of the drain, or in the topmost water-closet or sink, acts in a similar manner by appealing to the sense of smell. But this is in no way to be compared to the smoke test.”

NEW JERSEY SANITARY ASSOCIATION.

The New Jersey Sanitary Association continues to be an important aid to the sanitary progress of the State. It brings together each year health officers, members of Boards of Health, physicians and prominent sanitarians. These are aided by chemists, engineers, plumbers and such other professional and intelligent citizens as can find time to attend. The number present cannot be large, but the papers read and the discussions are freely disseminated through the State by the press, while local officers learn much from each other as to methods of sanitary administration. It is urged upon all Boards of Health that they have a representative present, and upon Sanitary Inspectors that they do not fail to attend. The information derived is always of benefit to the localities from which members come. The expense of attendance is small, and no money is more profitably expended by the Local Boards or by individuals. This report always contains an abstract of its proceedings, but this cannot take the place of actual attendance.

STATE CHARITIES AID ASSOCIATION.

The State Charities Aid Association was incorporated March 26th, 1886, and by act of Legislature, passed April 13th, 1886, was authorized to make written application to the Justices of the Supreme Court for the legal appointment of Visitors, as needed, to visit charitable, penal or reformatory institutions. Its first members were chiefly the Morris County Charities Aid Association and a very few from other

parts of the State. It was well fostered by this parent association, and made two reports, but it was not until this year that it came to have a clear and well-defined status and made its first report to the Legislature. While the work of this association has especial reference to a study of the management of institutions—of the best methods of dealing with the dependent or criminal classes, and the most effective methods for diminishing pauperism and crime—it also is very collateral to the work of this Board in its sanitary oversight of all such institutions. We welcome it as thus co-operative, as well as for its chief aims and beneficence, and bespeak for it the interest of all such as have at heart the physical and moral welfare of those who are the wards of the State.

THE STATE HEALTH LIBRARY AND LOCAL BOARD LIBRARIES.

While we do not need to purchase as many books as formerly, it is our effort to secure all important books and treatises on subjects related to sanitary science and practice. We receive about fifty volumes a year also as exchanges—many of them valuable health reports. Our last catalogue is contained in the fifth report (1881). We have been delayed in re-arranging Library by changes being made in the State House, but hope next year to present a full and better-arranged catalogue. In the meantime the Library is open to the use of all Boards of Health, and books on any subject will be loaned for two weeks, if the expressage both ways is paid. We desire, also, to encourage all Local Boards of cities to have small libraries of their own, and will, when we can, send duplicates of books which are sent to us, but are already in our Library. Each Local Board should be careful to have the State Reports, as they will be found to contain some information on almost every subject connected with sanitation. The index to all papers and subjects is contained in the last report (eleventh, 1887).

RELATION OF HUMAN AND ANIMAL DISEASES.

There has long been a recognition of the fact that there is a close resemblance between some diseases of mankind and those of the lower animals. For instance, the view was long ago entertained as to small-pox, that it is a disease which, communicated from man to the horse and then to the cow, becomes modified into kine-pock, or that a dis-

ease originating in the horse and communicated to the cow becomes cow-pox, or vaccinia. Even more definitely than this it was claimed that some animals could catch some of the diseases of man. It was, however, reserved for a comparatively recent period for us to be able to collect and analyze a sufficient number of facts to prove the communicability, or interchangeability, or identity of certain human and animal diseases, and to see the most important bearing of the facts secured upon the prevention and limitation of disease. Thus says Fleming: "Mankind has the aptitude to receive anthrax, rabies, foot-and-mouth disease, glanders, cow and horse-pox, diphtheria, and in all probability tuberculosis—not to mention the reception of entozoa and epizoa, entophytes and epiphytes, which give rise to morbid conditions, often of a most serious nature, in our own species."

As an illustration, we may best take the tuberculosis of man and animals. Before the able brochure of Dr. Creighton, of Cambridge (1876), there had been accumulating many observations that pointed to a relationship between human and bovine tuberculosis. His careful microscopical, histological and pathological investigations, with facts presented in evidence, seemed to make out a strong case as to the marked similarity and possible identity of the disease, as found in man and in the lower animals.

These have been followed by accumulated evidence derived from various sources. (See summary of same in the first annual report of Bureau of Animal Industry, Washington, 1884, pages 350–370.) A great interest was added to these investigations when tuberculosis in man, as also tuberculosis in animals, came to be claimed as, under some circumstances, infectious or transmissible diseases. So high an authority as M. Chauveau, of the Lyons Veterinary School, in recalling the recent researches which have led to considering tuberculosis as an infectious malady, says: "Foreseen by the illustrious Morgagni, and afterwards suspected by Andral and Laennec, the infectious nature of tuberculosis is now no longer disputable since the work of Villemin, of Koch and others." He then recalled the experiments of the school of Lyons, "the researches of which have placed the identity of human and bovine tuberculosis beyond a doubt. The transmissibility of a similar malady from one species to another is fertile in practical consequences." (See minutes of Congress on Tuberculosis, Paris, 1888.)

George Fleming, F.R.C.V.S., Principal Veterinary Surgeon of the

British army, in a letter to the *London Lancet*, April 7th, 1888, speaks thus: "The letter of Dr. Creighton, in *The Lancet*, once more draws attention to the most important subject of bovine tuberculosis and its relationship to tuberculosis in mankind and other creatures. * * * Dr. Creighton is right, so far as I know, in ascribing to Klencke the first published notice of the communicability of the malady to mankind by means of the milk of 'scrofulous' cows."

"But the evidence rested only on clinical observation, and though the cases he adduces appear to warrant the conclusion he arrives at, and though, also, in recent years, similar observations have been made public, yet they are not absolutely convincing that the human species can be, or has been, so infected. But clinical observation and most careful experiments on animals have gone far to demonstrate that infection of mankind by the flesh and milk of tuberculous animals is possible—nay, very probable. And in this demonstration members of the veterinary profession have played a very important part, though Villemin, of the Val de Grâce Hospital, Paris, in 1865, and again in 1866, led the way in experimental investigation. Soon afterwards Gerlach, then principal of the Hanover Veterinary School, undertook a series of experiments, which were conclusive as to the communicability of the disease to various species of animals. At the same time (1868), Chauveau, then at the Lyons Veterinary School, instituted experiments which had the same results as those of Gerlach, and proved beyond doubt that the disorder could be conveyed not only by inoculation, but also through the digestive apparatus. Chauveau was, I believe, the first to indicate the danger of allowing the flesh of tuberculous cattle to be utilized as human food. The veterinarians, Harms, Günther, Bollinger, Bagge, Zürn, Semmer, St. Cyr, Jolin, Leisering, and others, experimenting in the same direction, all reached the same conclusions, and, with Toussaint, of the Toulouse Veterinary School, undoubtedly showed that flesh and milk were infective.

"So strong and so startling was the evidence thus accumulated, and so alarming did the matter appear with regard to the public health, that in the *British and Foreign Medico-Chirurgical Review* for October, 1874, I called attention to its urgency, gave the chief facts—clinical and experimental—recorded up to that time, and concluded the paper as follows: 'From what has been already ascertained, there is every reason to view with grave suspicion the use of the flesh of phthisical cattle as food, especially if the disease is much advanced and the tissues are generally involved. But with more reason the milk from cows affected with tuberculosis should be prohibited, more particularly for the use of infants, who mainly rely upon milk for their sustenance, and whose powers of absorption are very active. Even if this milk did not possess such dangerous infective properties,

its deficiency in nitrogenous matters and in fat and sugar, and the increased proportion of earthy salts, would alone render it objectionable as an article of diet. It has long been known that it was liable to produce diarrhoea and debility in infants; but, though many children fed on such milk may have died from general or localized tuberculosis, the part probably played by this fluid in its production has not been suspected.' Since that time I have seized every opportunity of insisting upon the danger of tuberculosis in cows, in *The Veterinary Journal*, in public addresses, and especially in my work on 'Veterinary Sanitary Science and Police' (Vol. II.), published so long ago as 1875, I have earnestly endeavored to point out the destructiveness of the disease among cattle, and the peril to which its extensive prevalence exposes our own species."

At the recent meeting of the British Medical Association, at Glasgow, August, 1888, Professor Edgar Crookshank, of London, the distinguished microscopist and biologist, read a paper on "Tuberculous Cows' Milk." Dr. Crookshank regards "the tubercular bacillus of the cow as identical with that found in man. In view of the fact that milk from tubercular udders must frequently come into the market, he considers that immediate legislation is demanded. In reply to Dr. Coals, Dr. Crookshank said that the disease of the udder was not a mere local condition, but part of a general tuberculosis. Its importance, however, consisted in the fact that if the udder was unaffected, the bacilli were not found in the milk. Professor McCall, of Glasgow, thinks that he has seen the disease transmitted from tuberculous cattle where no disease in the udder could be found. Professor Crookshank stated that the opinion that there was any difference in size between the tubercular bacillus, as found in bovine and human tuberculosis, as held by Klein, was probably due to the fact that Klein had examined bovine tuberculosis only in sections. The bacillus as found in tubercular milk has quite the same size and appearance as that found in tubercular sputum. Inoculation experiments with sputum and milk gave the same lesions and the same bacilli in rabbits." The significance of all these views is greatly emphasized by the proceedings of the "Congress on Tuberculosis of Man and Animals," held in Paris from July 25th to July 31st, 1888. It commanded the attendance of three hundred members, almost every country being represented.

While the veterinary profession was the more largely represented, eminent medical authorities united in their testimonies. The papers

and discussions took a wide range as to the evidences of tuberculosis and its modes of propagation in man and animals. Experimental and chemical evidences were adduced. The character of the proceedings and the eminence of many of the authorities have given to this Congress a large consideration from the medical profession, and by all sanitarians. The tone of professional opinion is well represented in the two following extracts from editorials—the one from the *London Lancet* of September 1st, 1888, and the other from *The (Philadelphia) Medical News* of September 8th, 1888:

“The recent Congress on tuberculosis, held at Paris, under the presidency of M. Chauveau, affords a striking illustration of the widespread interest that is taken in, as well as of the importance of, an accurate study of this disease. The keynote of the proceedings was contained in the affirmation by M. Chauveau that now, thanks to the observations of the past twenty years—from Villemin to Koch—we have been awakened out of the false security of believing in the innocuity of tubercle, and recognize the grave possibilities of its transmission from animals to man. Throughout the whole of the discussion there was hardly a dissentient voice against the contagiousness of tuberculosis. One speaker after another rose to affirm his belief in the dangers to the human race arising from the consumption of the milk and flesh of tuberculous animals—and this, too, from various countries—so that it is not surprising that the Congress should have adopted resolutions aimed especially at the hygienic precautions to be taken in this respect. It recommends the inclusion of tuberculosis in the list of contagious diseases of animals, and the seizure and destruction of the flesh of every tubercular beast, no matter what may be its appearance. It declared that such resolutions were applicable to all lands, since in every part the question of tuberculosis presents the same problems. Moreover, the Congress urged the spread of popular instruction, especially in country districts, respecting the precautionary methods for preventing tubercular contagion, the risks which are run by the infection of meat and milk coming from tuberculous cattle, and the measures to be taken for the disinfection of materials derived from phthisical patients. Lastly, the Congress held it imperative that dairies and dairy farms should be rigidly inspected.

“Thus, then, we have it categorically affirmed that tuberculosis is not only a contagious disease, but that one of its chief means of prevalence in mankind is by communication from animals of the bovine species. Yet, in spite of the evidence in favor of this view, the question is one which has not been absolutely proved. Experimentation has demonstrated without cavil that animals fed upon tubercular flesh, or inoculated with the virus or the bacillary cultures in every possible way, become victims to the disease. Morbid anat-

omy long since proved that within the body tubercle may spread from part to part by a process of infection. There are isolated cases of the accidental inoculation of human beings, with the resulting development of local tubercular lesions; and, lastly, there are a few instances where the disease has every appearance of having been directly transmitted from one individual to another. Nevertheless, the vast amount of tubercular disease, in one form or another, in which there is absolutely no evidence of its acquisition by infection, may well make us pause before assenting to propositions which, of necessity, imply that everywhere and in all circumstances the disease is transmissible by contagion.

“At the same time, while recognizing to the full the great lack of unimpeachable clinical evidence in support of the transference of tubercular disease from man to man, together with the grave obstacles in the way of measures to prevent contagion among the community, to say nothing of the inhumanity which would follow their adoption, it does seem highly rational to check the consumption of articles of food which are proved to be derived from tuberculous animals.

* * * We regard the meeting of this Congress as very important. It has given an impetus to the study of tubercular diseases which must bear fruitful result. It has demonstrated how great is the change that has taken place in our conception of this class of disease, and we do not doubt that from every point of view—hygienic, therapeutic, surgical as well as medical, and pathological—much gain will accrue; whilst we may look forward to 1890, when the next meeting will take place, under the presidency of M. Villemin, in the hope that in all these respects a distinct advance will have been assured.”

“At the recent French Congress for the study of tuberculosis, certain propositions were presented by the President, M. Chauveau, and adopted, which relate to special prophylactic measures necessary to be observed in dealing with the contagious diseases of domestic animals, especially those which may be transmitted to man. The French government, upon the adjournment of the Congress, with commendable alacrity, adopted regulations suggested by the action of the Congress, which are to be enforced for the prevention of the transmission of tuberculosis from animals of the bovine species. Cattle are to be placed under the supervision of sanitary veterinary surgeons, and animals found to be tuberculous are to be isolated and sequestered, and when killed must be killed in the presence of the Inspector, who must make a post-mortem examination. Meats obtained from such animals, when the lesions are definitely ascertained, are excluded from sale, and are not even to be fed to animals, but must be destroyed. The sale of milk from tubercular cows is forbidden, though after being boiled it may be fed to animals. * * *

“Tuberculosis being recognized as a contagious disease, and in all probability transmissible from animals of the bovine species to man,

it is the duty of the State or general government to enforce stringent measures directed against the spread of this disease, and forbid the sale or use of meats from animals affected by it. As it is probable that infection is conveyed by alimentation, particularly by milk, the sale and use of milk from tubercular cows should be forbidden. In the absence of such a regulation, or its enforcement, safety lies in the practice of boiling the milk before using it."

"The President, M. Chauveau, finally presented the following propositions, which the Congress adopted:

"1st. It is necessary to place in the jurisdiction of the Boards of Health all questions having a relation to the contagious diseases of domestic animals, including even those that to-day do not appear to be transmitted to man. To vaccinia, glanders, hydrophobia, malignant carbuncle, tuberculosis, other infectious diseases can be added later, which will necessitate the same precaution.

"2d. It is necessary to use every possible means, including indemnities to the owners, for the general application of the principle of seizing and destroying totally all meats derived from tubercular animals, whatever may be the extent of the specific lesions found on those animals.

"3d. It is necessary to print simple instructions which are to be distributed in all cities and villages, and in which are contained the methods to prevent tubercular infection by alimentation, particularly by milk, and the manner of destroying the virulent qualities of the germs contained in the sputa, linen, beds, &c., of consumptive patients.

"4th. The cow-houses must be especially placed under the watch of an Inspector, especially those that produce and furnish the milk used in alimentation, so that the contagious diseases from which they may suffer should not be communicated to man.

"5th. That tuberculosis be inscribed in all the sanitary laws or regulations of the world, as a contagious disease, necessitating special prophylactic measures."

(See further, as to the relation of human and bovine tuberculosis, Creighton, Transactions of International Medical Congress, 1881; Fleming on Tuberculosis, Pamphlet, Baillere, London; Tuberculosis, Drs. McGee and Klophele, Memphis, 1886; Bovine Tuberculosis, Blaine, Willard Asylum, N. Y.)

While we are of those who are slow to accept as proven any evidence of communicability not certified by clear and abundant clinical evidence, surely enough has been adduced to show that we have reached a period when greater precaution should be used. When the world-wide prevalence of consumption is recognized, and while our last

national census shows it first in frequency in the list of deaths from all diseases, we cannot be too much on the alert in recognizing the relation of the condition of the flesh and milk of the bovine species to the extension of the disease. It is always to be borne in mind that if a disease is shown to be communicable it may also be shown to be difficult of communication. Or it may be shown that it is only communicable when it finds its proper surroundings and a proper soil, and that these are only found where there is neglect of proper sanitary precautions, or where the individual, by a proper hygiene, could be protected from susceptibility; while, if the specific microphyte is the *contagium vivum*, we should use every precaution to remove or destroy it. We are also to bear in mind that there is a positive and encouraging field of operation, in rendering places and persons unsusceptible to attack. We have thus singled out human and bovine tuberculosis as fairly representative of diseases probably identical in men and animals, and probably communicable under some circumstances.

These observations are rendered of great importance, not only because of the gravity of the disease, but because tuberculosis is so prevalent among milch cows. A moderate English statement claims that from fifteen to twenty per cent. of all cows are affected. In this State we have very frequently found the disease. It appears chiefly in stables where the cattle are tied in rows, and where ventilation is defective. The per cent. stated is larger than with us, but not larger than we believe to be the average in city dairies.

The facts should lead physicians to an inquiry as to the milk used by children; and often precaution will require that it be boiled. Also, it should be urged upon the attention of our legislators that this and other animal diseases hazardous to mankind are on the increase. The first effective measure of prevention to be adopted is competent veterinary inspection of all milch cattle kept in city limits. Boards of Health should be charged with this duty. The public have little idea of the number of city-kept cattle, and of the fact that a large proportion of them are diseased. If only city dairies could be properly cared for, we would soon diminish tuberculosis and other diseases.

We are to remember that this tuberculosis is far from standing alone. There are at least fifteen diseases of mankind and of other animals in which relationship and probable interchangeability are claimed.

Two observations besides those as to tuberculosis are especially

worthy of note. In the tenth report (1886) of this Board, page 63, and eleventh report, page 421, we noted the observations of Power and Klein as to the identity of scarlatina with a disease discovered in cows. These were afterwards disputed by Crookshank. A series of cases reported recently by Dr. Russell, Health Officer of Glasgow, as to an outbreak at Garnethill, bear a striking analogy to the Hendon cases. The milk-supply of every family was inquired into. One hundred and seventy-two families, supplied by Dairy X, yielded ninety-five of the cases of illness, while 1,301 families, supplied by other dairies, yielded but one case. A close inquiry and analysis of facts showed that milk X was not infected through a human medium. An examination by Dr. Russell and others revealed in the cows appearances resembling those described in the Hendon cases. Other experiments are being made, and it is too early to decide the full significance of these facts. It is, however, of import that Sir James Paget and various members of the Epidemiological Society of London accept the view that in some cases scarlet fever is derived from a disease occurring on the teats of cows.

As to the communication of diphtheria from the lower animals, a sufficient number of facts have not yet been observed and classified. It is noted that disease among chickens, quite similar to diphtheria, often prevails at the time of an outbreak of diphtheria in some isolated family. Thus, Dr. Turner, of the Local Government Board, England, "considers this mode of diphtheritic distribution possible," and cites cases to show that outbreaks of diphtheria have, in more than one instance, been coincident with the occurrence of "strangles" among horses. He also found in some of his official inquiries that when diphtheria was present in a district, the fowls suffered from fatal throat affections. (See *Sanitary Record*, June 15th, 1888, and July 16th, 1888.) Dr. Delthill claims that the frequency of diphtheritic affections in and near Paris is owing to the presence of badly-kept poultry. The same has been claimed by several observers here in this country. (See Prof. Whitaker, *Medical News*, Oct. 6th, 1888.) M. Menzies attributes an outbreak of diphtheria at Posilippo, near Naples, "to the patients having drunk water from a well into which the excrements of numerous fowls and pigeons had been washed by the rain." (See *British Medical Journal*, April 28th, 1888.)

The fact that cats are often the carriers of contagion seems well established, but recently Dr. Low and Dr. Turner, of the Local Gov-

ernment Board (1887), have adduced some significant facts to show that cats impart and contract diphtheria. (See article, *Sanitary Record*, June 15th, 1888, page 553.)

As to various other alleged intercommunicable diseases, we do not need to speak at length. In 1869 Dr. Thorne discovered that the milk from cows suffering from foot-and-mouth disease was capable of producing disease in those who partook of it. The fact is now fully recognized by all English physicians. Actinomycosis is probably transmissible. Anthrax and glanders have long been recognized as thus communicable. (See, as to various animal diseases that are communicable, article by Ezra M. Hunt, M.D., first report of Bureau of Animal Industry, Washington, D. C., 1884, pages 437-444.) Unusual prevalence of boils has seemed to be traceable to the use of diseased meat. When we consider our relations to animals, and some of the facts adduced, together with the well-known aptitude of milk as the conveyancer of the specific poison of several diseases, we may well be on the alert in studying the relation of animals to the human diseases with which we, as sanitarians and physicians, have to deal.

LAWS TO WHICH THE STATE BOARD OF HEALTH HAS RELATION.

The most important law to which the State Board bears relation is that found in Chapter LXVIII., Laws of 1887, and also to be found, with explanations, in Circular LX. issued by this Board.

While quite similar to some previous laws which it repealed, it is improved in order and clearness, and made fully to conform to the decisions of the higher courts. It secures a uniform health administration for the whole State, and is believed to be the best health law to be found in any of the States.

LAW AS TO VITAL STATISTICS.

Second only in importance to this is the law as found in Chapter XXXIX., Laws of 1888. It, too, is a consolidation of former laws, with such improvements as are indicated by the progress of statistical knowledge and the decisions of the courts. Circular LXV. of this Board contains the law with all needed explanations.

LAWS AS TO ADULTERATION OF FOODS AND DRUGS.

The first general law as to adulterations is to be found in Chapter CCXVII., Laws of 1881, and in the supplement thereto, Chapter CXXXIX., Laws of 1883. It is fully explained in Circular LIX. of this Board.

Our reports show considerable work done in former years under this law. But experience showed us that any such law had both commercial and health aspects, and that as a practical fact the prevention of admixtures and substitutes not injurious to health, but injurious as commercial frauds, would necessarily make up a large part of the work in the execution of this law. The special appropriation made for the execution of this law was only \$1,000, which was not at all adequate to the wide scope which the full enforcement of the law would require. Accordingly, this Board has of late confined itself mostly to inquiries into adulterations harmful to health, or to instructing Local Boards as to their rights of control. This was all the more proper because an examination of the work of foreign analysts, and of such elaborate reports as that made by the New York Committee of Analysts, showed comparatively few dangerous adulterations. Thus, President Bayles, of the New York Board of Health, in a letter to Mayor Hewitt (1887), says:

“The experience of this department has been that cases of hurtful adulteration of food and liquor are comparatively rare. The adulterations usually encountered are made in the interest of bulk and cheapness, and the materials used for this purpose are seldom in any other respect hurtful than that they are likely to be indigestible. In the case of liquors, even of imitation of wines into which no grape juice enters, it has been found that if the alcohol is eliminated, only the fruit syrups of the soda fountain remain.

“For many years the officers of the department have discharged their duty in this matter vigorously and intelligently, and with marked benefit. It is difficult, if not impossible, to find on sale in New York a sample of confectionery with poisonous coloring or flavoring. There has also been a marked improvement in the character of the milk and meat-supply of the city, and such adulterations as are known to exist are simply frauds on the purchaser. As frauds they do not come under our notice.”

This course was all the more indicated because the State created the special office of Milk Inspector and passed special laws to prevent the fraudulent changing of the article which had been tampered with

more than all others together. (See Chapter LXXXII., Laws of 1882, and various supplements, as referred to in Circular LIX.) Since then another special law as to adulteration has been passed, viz., the Oleomargarine Law, Chapter LXXXIV., Laws of 1886. The officer under this law is known as the Dairy Commissioner, and the Milk Law is also under his jurisdiction. In addition, Chapter CXXVI., Laws of 1887, confers on the Dairy Commissioner the same power which the State Board has under the law as to the adulteration of foods and drugs. An appropriation of \$10,000 was made, which, with the amounts received from fines, is under the direction of William K. Newton, M.D., the Dairy Commissioner, and provides for the effective execution of these laws. His zeal and efficiency in the execution of these laws are well known. The State Board of Health appoints the Dairy Commissioner, but his official authority and his work are entirely independent of the Board. We are thus properly left to look after the direct health administration of the State, and after so much of the law as to the adulteration of foods and drugs as shall detect frauds directly hazardous to the public health. The examination of water, and of any foods or drinks from which any sickness is suspected to have occurred, are therefore attended to by us. Local Boards may either have such examinations made, or, if reported to us, they are likely to be made in all cases of well-grounded suspicion.

The rarity of cases thus reported and the examination of the reports in those States and cities where a public analyst is provided, show how comparatively rare are adulterations by poisonous or hazardous substances. During the past year we have had occasion to examine several cases of suspected water-supply. In one case scarlet fever was suspected to be caused by an eruption of the teats of cows, and a consequent contagion from the milk used. The suspicion was not verified by the examination. Samples of jelly-cake and of cheese have also been examined. The cases are comparatively few in which adulterations are alleged to have caused sickness or death, but these are promptly attended to by the Board. Still, there is need of vigilance, and we ask the aid of all Local Health Boards in this service.

LAWS AS TO ILLUMINATING OILS.

The first law to regulate the sale of petroleum and its compounds is to be found in Chapter CLXVIII., Laws of 1883. It was amended and made more effective by Chapter XCVII., Laws of 1883.

The law was executed with vigor, and finally commanded the co-operation of all the standard companies. Both on account of the methods used and because of new interests of the trade, oil for inside lighting which will not stand the flash-test prescribed in the law is seldom offered for sale. Accidents have very greatly diminished, and those that occur are generally not from explosions, but from the use of kerosene for kindling fires. Nevertheless, Local Boards should never let an accident occur without inquiry into the details, and should either make examination or present us such facts in evidence as will lead us to order investigation.

The law is fully explained in Circular XLII. of this Board.

LAW AS TO PRACTICE OF MEDICINE AND SURGERY.

This law, Chapter CXCIX., Laws of 1880, and supplements thereto, require that in the County Clerk's office of any county in this State in which any one begins the practice of medicine, he shall file a copy of his diploma, or a certificate instead, in case of practice for twenty years in any one place in the State. This Board has no relation to the law, except that County Clerks are required to furnish to the State Board of Health each year the names, &c., of all who have thus filed diplomas. These lists are published in the annual report.

LAWS AS TO CONTAGIOUS DISEASES OF ANIMALS.

The laws as to contagious diseases of animals are explained in Circular L. of this Board. Many important facts as to various communicable animal diseases are also given. Since, however, this circular was prepared, the principal law has been restated, and is to be found in Chapter CCXXV., Laws of New Jersey, 1886. The law as to glanders is to be found in Chapter XLIX., Laws of 1884. As the United States Government has made appropriation for the stamping out of pleuro-pneumonia in the United States, and as our laws could not reach the adjacent States from which the chief infection in this State occurs, arrangements have been made, under the law and with the approval of His Excellency the Governor, by which, with consent of the owner, the purchasing and slaughtering may be done by the United States Veterinary Inspectors. The right of quarantine could not be

transferred, and this Board still exercises oversight and has report of all cases of the disease.

Besides these, there are various laws affecting the public health, as to which this Board is consulted by Local Boards. The most of these are enumerated in Circular LX.

LAWS AS TO PLUMBING.

The important law as to plumbing, Chapter LVI., Laws of 1888, is properly placed under the direction of Local Boards. All necessary facts as to it will be found in Circular LXV. of this Board. A recent discussion of master plumbers in Philadelphia, on a resolution "That all soil-pipes inside of houses should be tested," contains so many suggestions that we insert it :

"The question of the different kinds of tests was then taken up. William S. Clark explained the test recommended by the Inspectors of the Board of Health. Mr. Clark said : 'A favorite test for terra-cotta pipe is to stop up the outlet to the sewer and fill the pipe with water. If the pipe stands that strain it is all right. My experience has shown this test to be a very severe one. The joints on terra-cotta pipes will not stand much strain. In one case I was called on to fix a drain which ran through a cellar. Every time it rained the water backed in from the sewer and the pipes leaked. I took up the pipes, relaid them, and filled the joints with the best Portland cement. When I stopped the outlet in the pipe and filled it with water all the joints leaked. I took out the cement and used another kind, which I let dry for a week before allowing any water to run through the pipes. I didn't apply the test, but I suppose it is all right, for I haven't had any complaint since.'

"John Worthington, who believes in the sulphur test only, said : 'It is not the material used but the poor workmanship that causes complaint. In the last six months I have found many reasons for complaint. I have found bells that were broken in calking, traps unseated, and where solder should have been putty and red lead were used. I am here ready and willing to uphold the craft, but the plumbers have not done their duty. The day has come in Philadelphia when they will be forced to do it, and I am glad *The Times* has had the courage to come out and manfully tell us we must do better work. The question naturally arises, "How are we to know when we have made a good job?" Some may say by test. I have tried every known test and none gives the satisfaction the smoke or sulphur test does. We do not want a pressure on the soil-pipes. If water is used and there is a break in the pipes the house is flooded and damaged.

If air-pressure is used the pipes are not only strained unnecessarily, but the water is blown out of the traps. With the sulphur or smoke test we have the result at once.

“‘No matter how reliable the workman may be, he is never sure the work is properly done until it is tested. After a man had finished some work in a bath-room he assured me it was tight. I applied the smoke test and in four minutes I had that room so full of sulphur smoke that no one could live in it, although the opening was no larger than a pin’s head. Other things we want to look after are the joints. If a joint is made with putty and red lead it is sure to crack. All joints should be made with solder when possible. What we want to do is to look after the fixtures which are covered up and hidden out of sight. In our tests we do not need a pressure, but we want some test which will show at once where the leak is.’

“‘I am opposed to terra-cotta pipes being used inside of houses,’ said Harry Coffin. ‘All soil-pipes should be of iron, with leaded joints, and I think we should adopt a better standard than that which pipe-makers are now throwing on the market. I am in favor of hydraulic tests for all work, and I think when it is found to be all right under pressure it certainly cannot be faulty when the pressure is relieved.’

“John E. Eyanson was in favor of abolishing terra-cotta pipes altogether. He said: ‘I think all soil-pipes should be tested first under pressure when they are laid. When the work is completed I would have the work proved. If house-drainage is to be tested, and it should be, we must do away with terra-cotta pipes for all inside work.’

“‘I am not in favor of the hydraulic test,’ said John J. Weaver. ‘What we want is a test which can be applied with safety in a furnished house as well as in a new building. Suppose the pipes should break in a furnished house. Look at the damage that would be done before you could get the water out of the pipes.’

“Mr. Worthington then described a house he had been at work on. ‘With the sulphur test I found thirty-seven leaks in one hour, and the smoke filled the house from the cellar to the garret. I found it coming out of the foundation walls, and through six feet of solid earth in the cellar. The place was in a miserable sanitary condition. If water had been used to test these pipes the whole house would have been flooded and the plumber would have had a big bill to pay.’

“‘I am in favor of a smoke and air test,’ said William Harkness, Jr. ‘I have used this test for over a year and it has given satisfaction every time. I think a slight pressure should also be used and the air and smoke forced into the pipes at a pressure not exceeding one pound to the square inch. I used this test at a house on Camac street, and the gentleman moved out because his pipes were in such a bad condition. The smoke came out of every joint.’”

The New York Board of Health now requires plumbers to apply the air-pressure test to plumbing work, in the presence of the Inspector, by means of an air-pump and pressure-gauge. The water department does not issue a permit for water in the house until the certificate of such test is produced. Boards of Health should be familiar with the various health laws of the State. We gladly furnish full information as to them and the practical modes of enforcement.

LEGAL DECISIONS.

The health legislation of the State is now so fully authenticated that these laws are likely to be fully sustained. There will no doubt arise cases where, either by irregularity of procedure or by reason of insufficient ground for action, Health Boards will not be able to sustain their complaints. But where the law has been conformed with, or where ordinances are properly drawn and administered, the laws are clear and operative.

Various decisions of importance are now on record in the court reports of the State, with which the Boards and their legal advisers are easily made familiar. We append reference to two cases merely as illustrative of the increasing consideration given to all health administration, as belonging within the limits of police regulation.

Thus, John R. Hardin, attorney of the Board of Health of Newark, in its last report, speaks thus :

“There was pending at the time of my appointment a *certiorari* to the Essex Pleas, taken to raise the question of the validity of the Board's ordinance concerning night scavengers and their work. This *certiorari* was argued at the June Term of the Supreme Court, by Mr. McDonald and Mr. Conover for Chas. Holzworth, the plaintiff in *certiorari*, and by your attorney for the Board. A decision was rendered in November in accordance with the views advocated by the Board, directing the Essex Pleas to dismiss the appeal, and leaving the judgment in behalf of the Board in the police court unaffected.

“This decision was an important one to the Board, because it practically recognized the Board as an independent body, the court deciding that the ordinances of the Board were not *city* ordinances, and that the provisions of the city charter, applicable to a review of a police court judgment on a suit for a penalty for a violation of a city ordinance, had no application to a similar suit for a violation of a health ordinance.”

The Hon. John P. Stockton, the Attorney-General, in his annual report for 1887, speaks thus :

“Other matters, some of them of grave importance to the interests of the State, have required the attention of the Attorney-General’s office. Prominent among these was a suit brought by the Newark and South Orange Horse Railroad Company against the State Board of Health, to recover the sum of \$20,000, the alleged value of a large number of horses belonging to that company, and which had been destroyed by the agents of the Board as being infected with glanders; the foundation of the suit being the alleged want of power on the part of the State to authorize the destruction of private property without making compensation for it. It will be seen that this case involved the question of the constitutionality of the various acts of the Legislature creating the State Board of Health and defining its powers. The importance of this branch of the State government is at this day so thoroughly understood that the absolute necessity of resisting an attack upon it which, if successful, will destroy its existence, must be apparent to every one. Careful attention, therefore, was given to the preparation of this case, and it was thoroughly argued on the part of the State at the last November Term of the Supreme Court.”

The opinion rendered at the February (1888) Term of the Supreme Court, in sustaining the constitutionality of the law concerned, has important bearing on all health administration and abatement of nuisances.

We quote from the opinion as rendered by Justice Magie, as follows :

“There is nothing in the decision in *Hutton v. Cowden*, or in the learned and well-considered opinion of the Chief Justice, which gives the least countenance to the notion that the Legislature may not authorize the abatement of a common nuisance, until after its character as a nuisance has been determined in a judicial proceeding, with the safeguard of notice and opportunity to the property-owner to be heard. Such a doctrine enforced by the courts would interpose an almost absolute barrier to the praiseworthy efforts everywhere made to prevent preventable disease, and to stamp out contagion and infection affecting public health and comfort, and would render much of the health legislation of to-day of no avail. But I think it cannot be claimed that the rights of a property-owner will be improperly interfered with by legislation authorizing the abatement of nuisances of this character, although in advance of a judicial adjudication, provided such an adjudication, with notice and full opportunity to be heard, is not

denied, but may be evoked and compelled. As has been said in this court, every property-owner holds the title to his property subject to the paramount consideration of the health and safety of the public, and the power of the Legislature to fix upon it, when in certain conditions, the brand of noxiousness to public safety or health. If his property, in common with other property of the same sort, has been legally declared to be subject to destruction, when in certain conditions, noxious to the public, he cannot complain of its destruction if it was, in fact, in those conditions. It has never been pretended that the fourteenth amendment marked the abolition of the common-law rule which justified any one specially affected by a nuisance in abating it, without waiting for an adjudication that it was a nuisance which he might abate, but unless the fact of the nuisance was established by proof, he was liable to the aggrieved property-owner as for an unwarranted trespass. The amendment was, in my judgment, likewise ineffectual to prevent the State from providing, under its police powers, for the immediate abatement of public nuisances actually existing, though not yet judicially adjudged nuisances. In such case the officer entrusted with the power of abatement could not be protected if he destroyed property without the existence of those conditions which make it a common nuisance, and justify its destruction. But if the property-owner is not deprived of a right to contest the existence of such conditions, and to obtain redress as for a trespass, if they are not shown to have existed, such legislative acts would not infringe any constitutional provision.

“These acts being of the character above indicated, are not open to this objection.”

These and various other cases and opinions show the intent of the law, and will sustain Local Boards in their action, subject, of course, to review as to the fact of nuisance.

THE SANITARY NECESSITY FOR THE CONTROL OF THE CONSTRUCTION OF DWELLINGS.

BY HENRY MITCHELL, M.D.,
President of New Jersey Sanitary Association.

The house has, until recently, been almost wholly excluded from the hygienic safeguards which State authority has, in many other particulars, gradually thrown about the citizen.

Notwithstanding that the dangers to health which exist in ordinarily-constructed dwellings have long been known to sanitary science, and have been faithfully pointed out and the remedies plainly indicated; and although it is in the house that more than two-thirds of the life of every family is passed, yet the oversight necessary to render safe and healthful this—the unit, the very center of sanitary interest—has been neglected or withheld.

The early history of sanitary legislation is a record of occasional attempts to overcome the military, financial and commercial evils which attend considerable outbreaks of disease and unusual mortality.

But these efforts ended with inefficient quarantine restrictions, which retarded true sanitary progress by unnecessarily embarrassing commercial communication, thereby creating popular antagonism and opposition to further attempts to prevent the spread of disease.

No consideration was given to the healthfulness of human habitations, although the great pestilences and frightful mortalities of former centuries were mainly due to unhygienic conditions in dwellings and towns.

Overcrowding and improper disposal of domestic refuse produced malignant outbursts of epidemic disease. Famine followed as the result of pestilence, and death and devastation seemed destined to depopulate the cities of Asia, Africa and Europe.

The improvement in the public health in London, following the great fire of 1666, which destroyed the greater portion of the miser-

ably-constructed houses in that city, attracted general attention to the influence of filth in promoting disease, and the gradual application of the lesson then learned—the making of wider streets; the building of larger, dryer, better-lighted and better-ventilated dwellings; the disposal of household waste by better methods—has forever driven away certain types of disease which were once very prevalent.

Public appreciation of the value to the State of good health and normal longevity in the citizen, and the application of sanitary principles, have been very slow compared with the accumulation of knowledge on this subject, and individuals—not the State—have demonstrated the value of hygiene.

The present status has only been reached after repeated occurrences of rare and striking epidemics, together with many exhibitions of the usefulness of preventive measures, and the unanswerable arguments furnished by the records of vital facts.

Governments have shown more energy in developing industrial resources than in the preservation of human life and health. Geological surveys; the improvement of plants and domestic animals; the study of meteorology, have all had attention, in response to the persistent demands of representatives of mining, agriculture, commerce and other business pursuits. Sanitary interests, however, have not yet joined together and united their forces to the degree which must obtain before determined, increasing and effective measures are universally put in operation for their furtherance. When we consider the frequent and convincing demonstrations which have in recent years been made, of the economic as well as humanitarian features of hygiene, there seems to be a relic of barbarism displayed by statesmen who give precedence in statutes to business and social concerns, and show indifference toward the means which are known to promote health, and which can be rendered available only by aid of legislative enactments.

The attitude of governments, whenever they have adopted hygienic measures, has seemed often to be half-hearted—merely conciliatory to the wishes of advocates of sanitation, instead of evincing an unbounded faith and confidence in the supreme advantages to the people and to the nation, to be derived from legal provisions which shall secure pure air, pure water, good drainage and safe dwellings.

When such legislation is provided, it is rarely accompanied by a

requirement that funds essential to its enforcement shall be appropriated; the execution of such laws is left to seek its own solution.

The progress now making in America, in the introduction of public water-supplies and sewer systems, indicates a rapid development of the sanitary idea.

The permanent purity of the water supplied, and the future safety of the sewage disposal, may not have received, in the haste attending the sudden grasping of a discovery, requisite consideration in all instances, but in the agitation which is aroused upon these questions, and in the willingness of citizens to submit to a tax for these safeguards, a promise is implied that defects and errors in primary construction will be corrected when they present themselves.

But a public supply of pure water and a perfect system of sewers will not avail in lowering death-rates, if avenues of entrance into dwellings, for sewer-air, are permitted to exist, and if polluted wells remain in use.

The accumulation of waste liquids upon premises will pollute the air of the vicinity, but who will contend that the conditions are improved if we cast these liquids into a sewer and give the sewer-air access to our sleeping-rooms?

Few persons are so thoughtless and negligent of health that they would contentedly dwell over an open sewer, yet large numbers of houses have sewer connections which conduct sewer-air directly to the inmates, in a form more concentrated and dangerous than any gases which may be wafted from cesspools, yards or open ditches.

The question may be asked, and it very often is asked, "If house-drains are frequently inviting and open avenues for entrance into the house for foul air, why do any of the occupants of any such houses escape illness?"

It is justifiable to reply that "none do." The degree of damage to health and the type of the disease may vary greatly, but no one who habitually breathes air loaded with the products of animal and vegetable decomposition will long continue in sound health.

The palid face, tired expression and inelastic movement of certain families, and in some instances of whole communities, indicate, as well as can words, a history of bad living.

Impure air and water stamp their marks upon human beings who subject themselves to these influences, inducing chronic invalidism in due course, even if none of the causes of specific disease chance to be

present in the inhaled or imbibed nastiness. If, however, the special cause of any one of the filth diseases is present in such air or water, the consequent illness assumes a recognized character, and inquiry into the source of the trouble, and an effort to remove it, are sometimes made.

But the doctrine of sanitation is prevention, and instead of waiting for the occurrence of disease, and the fatal results which can, with perfect certainty, be predicted, hygiene demands that inquiry as to the safety of conditions affecting health shall be made in advance of injury, without delaying for additional harvests of sickness and death to show anew that filth is the home and reproducing ground of a great group of the enemies of the human race.

An examination of 200 houses in Chicago, in which diphtheria existed, showed that but four of the whole number were perfect in their sanitary arrangements.

The epidemic of typhoid fever in Brooklyn, in 1885, was traced to faulty connections between houses and sewers.

The health officer of one of the large interior cities of the State of New York has recently investigated an outbreak of diphtheria, and he states that in nearly all of the houses where the disease existed, the drainage was so defective that it permitted gases to freely enter the house from the street sewer.

Here were the occupants of these houses breathing, for years, emanations from a putrescent mass, and struggling along under their neuralgias, sore throats, diarrhoeas, &c.; easy victims to every depressing influence; incapacitated for good service in any department of mental or physical labor; not available to the State as soldiers or statesmen, but liable to become objects of its charity—all because of lack of protection which the State only is capable of affording.

If these cases were exceptional and few in number, it might, with reason, be regarded as of doubtful propriety for the government to interpose its aid; but the mortality from preventable diseases is over 5,000 yearly in New Jersey alone!

Failure, therefore, to put into operation measures for the arrest of this unnecessary slaughter is wanton waste.

Taking \$1,000 to be the value of each life thus sacrificed, the annual loss, in money, for unnecessary deaths from the following diseases: diphtheria, 1,527; typhoid fever, 522; measles, 296; scarlet fever, 255; whooping-cough, 181, and small-pox, 5, foots up \$5,576,000.

Add twenty-eight cases of needless sickness for each death, at a cost of \$20 each, and the total yearly loss in New Jersey is \$8,698,560.

If consumption is added, the annual loss to the State is not less than \$12,000,000.

If the methods of disease-prevention, now well established and already in partial operation, could be extended to the whole State, the foregoing totals could be reduced fifty per cent. in twelve months. What sort of public economy is it which hesitates to supply the men and money necessary to stay this enormous loss?

In this State the Legislature has placed the responsibility for the saving of these lives upon local health districts; giving almost unlimited authority to councils and Boards of Health to use all reasonable means for the deliverance of their localities from the grievous incumbrance of preventable disease.

The appointment of a Local Health Board and the appropriation of a nominal sum for its use, is obligatory, but there the matter stops, in many communities.

Assuming that satisfactory health-protection can be obtained for an annual outlay of \$500 for each 1,000 of population, it follows that \$639,000 will meet all of the cost of this work for the whole State. This sum is equal to a per capita tax of *fifty cents*.

Compared with the annual loss at present sustained, the gain—if sanitary administration was well performed—would be at least \$4,000,000 each year.

Precedent has been abundantly furnished for the requirement that the water-supply, drainage, ventilation, heating and lighting of houses should conform to established principles: that house-construction shall be regulated to an extent which will prevent danger from errors and ignorance in all that concerns their sanitary features.

If it is contended that dictation to the citizen as to the manner in which he shall build his house, is tyranny on the part of the State, and partakes too much of the character of paternal government, and is inconsistent with American ideas and institutions, then laws regulating marriage and forbidding suicide are reprehensible and unjustifiable; for in the latter cases private rights are invaded quite as despotically as they are in the former.

Details of house-construction, relating to the exterior and to the materials used in the structure, have long been controlled in many

American cities, for the purpose of securing stability and for the prevention of fires.

Is it more un-American to prevent illness and premature death in the citizen than to prevent his financial injury?

Intemperance in eating and drinking; indiscretions in clothing and in the habits of life, and numerous other hygienic mistakes and crimes against natural laws, must be deferred for adjustment; but dwelling-house construction, which has long been awaiting its turn for reform, has at last received an impetus, and it will now undergo a gradual revolution.

Formerly the courts held that—except in cases of misrepresentation—no damage should be awarded where unsanitary conditions in dwellings were found to exist by tenants, and tenants were expected to protect themselves by an examination of the premises previous to occupancy.

The injustice of such a position seems to be recognized, for recently there have been judicial decisions allowing damages against house-owners for permitting unhealthful constructions or erections to continue, leaving the tenant responsible only for faults in domestic management and for unhealthful accumulations.

Sanitary supervision of the construction and condition of tenements, factories, hotels, and all other buildings in which persons dwell or are employed or entertained, and over which the tenants, employes and guests have no control, is particularly necessary, for in these cases the owner is generally personally attentive only to the extent of his financial interests, and the wretched ventilation, lighting, drainage and water-supply of many of these buildings are accountable for the headaches, impaired vision, rheumatism, consumption, &c., which embitter the lives of operatives, and help to make their expectation of existence only thirty-two years—the shortest of all classes of persons.

Assuming that it is admitted that government control of the construction of buildings is a sanitary necessity, the question arises, "How far shall such control extend?" 1. The safety of the site is of such vital importance to the whole subsequent hygiene of the house, that it surely should be required to be under supervision. It is well established that habitations resting upon a soil in which the ground-water level is low, are much more healthful than when they are built upon ground which is saturated with water. Few situations are in-

capable of being made dry by drainage. In London the level of the ground-water has been lowered thirty-four feet, and the improved mortality rate in that city is, doubtless, in a measure due to this drying-out of the soil. 2. The sanitary properties of building material. 3. The prevention of the entrance into the house of ground-air and dampness. 4. Strength of construction and the avoidance of danger from fire. 5. Ventilation. 6. Lighting, heating, and the regulation of temperature. 7. Water-supply. 8. The disposal of waste. All of these features of the house should, unquestionably, be regulated to some degree.

Existing prejudice renders moderation essential to progress in the execution of sanitary laws.

Coming upon the masses as an innovation, the protecting hand of government is welcome only when its purposes are clearly comprehended, and its benefits to communities and individuals are fully understood.

A wise and cautious execution of the laws created for sanitary control is, therefore, essential to their popularity, and to their uninterrupted continuance and usefulness.

Inasmuch, however, as municipal Health Boards are made up of persons who, as a rule, serve under an unexpressed protest, and who have no desire nor intention to long continue in their unpaid official position, nor any disposition to permit an alienation of friends, nor to make enemies of their fellow-townsmen, the tendency is strong toward excessive moderation, and there is probably little danger that the cause of health-protection will suffer at their hands by reason of its requirements being too vigorously applied.

Observation shows that the other extreme is far more frequently reached. Indeed, there seems to be no immediate prospect that the present system of sanitary government in this country will develop an energy in applying sanitary principles which will secure the best attainable results.

In New Jersey not one of the local health districts employs a tithe of its lawful resources in bettering its unhygienic conditions.

The direction, therefore, in which our efforts should now turn, is to more efficient administration of the powers already conferred by the Legislature.

Doubtless, many and varied propositions are now in embryo, which will have for their purpose the improvement of the application of sanitary principles by aid of new laws.

But until local health districts shall more fully appropriate and more generally profit by the legislative favors already bestowed, new duties and new responsibilities will prove to be new burdens—not benefits.

Few municipalities have yet supplied to their health departments the first and most essential requisite for good execution of laws and ordinances, viz., a competent and industrious executive officer.

The purse-strings must open before thorough and intelligent study of local sanitary needs and constant personal supervision can be secured.

Unpaid services of this character, for cities and large towns, will be superficial of necessity, for men who are masters of state medicine will not donate their time and services; nor should they be expected to.

Efficient executive officers are becoming more and more valuable to their localities in proportion to the rapid advances now making in sanitary science, and to the increasing number of diseases which are found to be preventable.

To them is entrusted the application of the precautions which avert illness and maintain health. To the physician falls the duty of restoring those who become sick.

Preventive medicine and curative medicine both deal with human ills—each striving to prevent premature death and the sorrows and losses which it entails; and to the skill of the practitioners of these arts, almost every individual in this age will finally be indebted for some important service.

The physician, by an evolution which has required centuries, has been divorced from ignorance and superstition, and to-day he is no longer a superficial blunderer who has picked up a stray fact here and there pertaining to his profession, but he is trained from boyhood to combat disease in all the light of past and present knowledge.

Should the professor of preventive medicine be less empirical in practicing his art? No! for *certainty* enters rarely into methods of cure, while in the tenets of prevention there is little that is *uncertain*.

Is it right, then? Is it business-like? Is it sensible to place unskilled persons in the executive office in health departments?

Sanitary inspection; its defects; its needs and the difficulties attending efforts to secure its improvement, have already been presented in various papers, and it has had our earnest consideration. But I

trust this subject may have renewed attention in the future, and that some method may be devised by means of which a more satisfactory inspection service may be finally obtained.

Whatever may be the attainments of the executive officer of a Local Board, he is powerless to anticipate health dangers and maintain good conditions on premises unless he has the aid of a sufficient number of well-informed and industrious Inspectors.

Like some others of the new problems which are constantly presenting themselves in connection with the endeavor to advance the interests of hygiene, the efforts to improve the grade of Inspectors prove to be exceedingly perplexing.

Men who are intellectually suitable, will not prepare themselves for this service while there is no prospect that they will receive proper remuneration and ready employment. And there seems not yet to be any probability that Local Governing Boards will show appreciation of the usefulness of these officers, by voting the funds necessary to induce them to seek preparatory instruction.

But there is no market for any commodity which does not exist, and until competent Inspectors offer themselves, and the value of their service can be *demonstrated*, no demand for them will arise.

Chapter LVI., Laws of 1888 (to control the plumbing and drainage of buildings), was, in substance, presented to the Legislature four successive years before it became a law.

It was, on each occasion, opposed by plumbers who had not yet realized that personal registration is a creditable distinction—not invidious—and which is demanded because of a quickening in the public comprehension of the important relation borne by this class of artisans to the health of their patrons.

The physician and the pharmacist are none the less honored, nor is their business made less profitable, because they are required to place their names on an official record.

These latter classes of persons, and also mechanical engineers, are further required to possess written evidence of their having qualified themselves to pursue their respective callings; and one of the next steps in the future progress of State control of house-construction should be, and it doubtless will be, a requirement that no person shall practice the art of plumbing until he shall hold a certificate from a proper authority, showing that he is capable of skillfully performing the important work pertaining to his trade.

By the operation of this and other statutes, the next generation of master plumbers will find themselves ranking as professional men rather than as tradesmen.

Viewed strictly from the plumbers' business standpoint, there is good reason for the enforcement of this new law.

The dishonest plumber can no longer underbid the honest dealer. The drawings and specifications will—when reliable Inspectors shall have been obtained—be complied with, and they will no longer be construed by sharp contractors to mean poor material and poor construction.

The provisions of the statute referred to place a responsibility upon Local Health Boards which many have thus far shrunk from assuming. The difficulty attending the enforcement of the law is to secure, with the limited means at hand, the service of competent persons to pass judgment upon the plans presented for approval and to inspect the construction.

But this phase of the problem must work itself out in each community, and time will doubtless prove to be an element in its solution, for—as we have already seen—governing bodies are not quick to dispense sanitary benefits.

An English writer has said: "That the universal diffusion of common means of decency and health is as much the right of the poorest of the poor as it is indispensable to the safety of the rich and to the State, and that a few petty Boards and bodies—less than drops in the great ocean of humanity which roars around them—are not forever to let loose disease on God's creatures."

Comfort, convenience and artistic effects have, in recent years, received increasing attention in America in dwelling-house construction; this marked improvement in the architecture, decoration and furnishing of homes accompanying increase in wealth and education, and the development of refined and cultivated tastes.

In the erection of these improved structures the guidance of the architect is essential, and it is almost invariably sought.

He has, therefore, greater opportunities than any other individual for securing the building of houses which shall be sanitarily safe.

The owner may doubt the sincerity of other advisers, fearing that suggestions offered may needlessly increase the cash outlay, but in the architect he has a guide who—being paid to serve his (the owner's) interests only—will have a single-minded purpose and undoubted ability to design a *safe* as well as a useful and beautiful building.

But a considerable proportion of practicing architects are unfamiliar with the principles of hygiene which relate to house-construction!

At present there is no legal restriction nor regulation intended to secure proficiency in their art affecting this class of professional men, and it is to be hoped that the movement already inaugurated for protecting themselves against unqualified competitors, and for maintaining the dignity of their profession, will result in examination and registration.

The fourteen years which have elapsed since the organization of the New Jersey Sanitary Association, and since the report of the State Sanitary Commission, have been years during which the principles of hygiene have been receiving renewed and general acceptance in all civilized lands. They have witnessed, in America, a sanitary revolution.

The talents and labors of devoted Sanitarians have aroused the enthusiasm and enlisted the co-operation of a large number of the citizens of our State in behalf of sanitation, and placed New Jersey in the front rank in sanitary advancement.

But the noble and beneficent purpose—to secure protection against preventable disease—cannot be accomplished by sudden flight.

Like every enterprise of benevolence, every reform, its progress leaves a history of toil and discouragements, but the future—the safe appeal of truth to time—will crown greater efforts with grander results.

ASBURY PARK, N. J.

OUR CHARITABLE AND PENAL INSTITUTIONS.

BY EZRA M. HUNT, M.D.

First consider what these terms mean.

Society is divided into two classes, the productive and deductive classes. Not that at any one time all of the profitable members of society belong to the productive class, but it is generally true that in the summary a valuable life has been more of a producer than a consumer. In this alone is progress, accumulation, success. Each individual is greatly concerned to know to which, in the adding up of his forces and his weaknesses, he has belonged. The same is true of each family. Still more is the State concerned to know which is in the majority and superiority, the productive or deductive classes. Even though the productive element is in preponderance, we must learn how many and how much of the other class has been a hindrance or a make-weight, and how far it can be removed. This is one of the greatest problems and highest studies of political economy, and as practical as it is profound. The State knows that its people are the chief of its material resources, or of its destructive deduction therefrom. So, not as a patronized philanthropy, but as a practical patriotism, we are compelled to watch and to reckon, to ascertain the relative proportion of these two great classes, the effect of the latter upon the former and how far these effects, where injurious, may be mollified or overcome. Ill health, poverty and crime are the largest deductions from individual and national prosperity. Realizing the need of health as an economic element, and how far it can be promoted by wise sanitary legislation and administration, this State has placed itself upon an efficient working sanitary basis. What has it done? what can it do in a similar way for limiting dependency and crime? These are the salient, radical questions of the period. We shall not tarry to note that the dependency represented by the almshouse and the crime represented by the jail and prison stand for a far

greater aggregate of outside want and outside criminality than can be expressed or accurately reckoned.

As a matter of expense we have only to turn to the Comptroller's report for the returns of the different cities and townships and find that there is an outlay of tens of thousands of dollars yearly besides the expense of buildings, &c.

If we could extend the study to individuals in alms-houses, as has been done in other States, we would find how much of this dependency is the direct result of intemperance, or of failure on the part of the State to look after its idle and orphan children.

When we turn to the records of crime and follow these from the industrial uselessness of the person arrested, through all the expenses of courts and confinement, we get an aggregate outlay which makes up the bulk of our taxes, besides the serious inroads it makes upon the peace and progress of society.

It is thus that the care of the criminal and the pauper classes becomes of the very highest concern to the morals, the prosperity, the entire welfare of the State.

ALMS-HOUSES AND THE CARE OF THEIR INMATES.

One of the most impressive developments of charitable societies and institutions has been the fact that unless we are on our guard, our very attempt to aid certain classes of society, and to provide them food, clothes and other relief, tends to produce and perpetuate the very class we seek to relieve. There is always among our people a shiftless population not loving work, and seeking to secure subsistence for themselves or for their families in the way that will require the least expenditure of force, and give them the most leisure time for promiscuous loafing. So soon as such find out that charity will provide for them and their families, so soon there is a motive to inaction and consequent dependency.

Hence, our charity organizations, by relieving present need, and then following the applicant to his home, or ferreting out the causes of the dependency, or its pretense, and by lending a helping hand to self-support, and refusing aid where the dependency is really voluntary, have done much in the right direction.

It is on such a principle that all State, county, city and township provision for the poor should be made. There must be a system by

which inquiry and visitation are made, and discrimination exercised. A rigid system must be put in operation, which will ever seek out those who should be helped, either in their homes or in institutions, which will exclude those who have no real claims, and which, even more, will plan for and help those who ought to be and can be made to be self-supporting.

Those who come into alms-houses must also have a close study of methods and plans as to their care, their occupation and, in many cases, looking to their temporary stay. We hope the time will come when most of the decisions as to who shall be in alms-houses or receive aid, and as to the classification and management of inmates, will come under the care of women committees duly appointed for such a purpose. What the State Charities' Aid Association has already done as well as what has been done by its efficient auxiliaries, is but an imperfect specimen of large possibilities for the future.

During the years in which it has been my duty to visit the charitable institutions of the State, it has been my privilege to initiate and secure many important changes, the value of which has been recognized by the immediate managers and by this Board. But as my duty was primarily and chiefly to look after the sanitary condition of buildings and inmates, it was only in a secondary way that I could at all reach those questions which still more vitally concern the inmates of these institutions. I could at least have many opportunities to study some of these problems, and aid in impressing the importance of more special inquiry into the causes of pauperism and the practical modes of its limitation.

At my earlier visits to Camden county alms-house, 100 tramps were among its winter boarders. The Freeholders have wisely broken up the whole system of their reception, as have some other counties. This, however, has caused other counties, and especially some jails, to have an additional share.

Over and over again I meet cases where the weekly visits of two intelligent persons with proper powers, who had studied the subject of pauper care, would entirely change the whole morale of institutions, as well as greatly curtail their expenses. Only personal acquaintance with each inmate and some of their history can secure this. The New York State system, as well as that of some of the Eastern and Western States, has shown how feasible is such an oversight.

In many of our alms-houses there is a freedom of intercourse be-

tween the sexes, greatly to the detriment of all concerned. Before I had been in practice sixteen years I had attended in alms-house childbirth a woman thus born in the alms-house, and the child at whose birth I had been in charge—this child, in its turn, also to have similar rearing. Even the few births do not represent the more continuous degradations. I could give example after example of exposures of half-demented persons, of epileptics, and of those not so accountable as the committees in charge of them, besides cases of more deliberate sin.

It is now well recognized that a complete separation of all children except small infants is necessary in alms-houses, if we would not perpetuate pauperism. Yet in only two alms-houses of the State has such a system been adopted.

Some time since I had a personal example of how alms-houses may encourage and perpetuate pauperism, as well as of the evil effects upon children. On my way to visit one of our largest county alms-houses, while waiting at a station, my attention was attracted to a plainly-dressed woman in charge of six children, the oldest being about thirteen years of age. It was in the late fall of the year, and taking her for some emigrant about to join her husband in the far West, I offered my services to aid her in getting the family on the train. I then inquired whither she was journeying. The reply was, "To the county alms-house, sir." She told me that her husband was a stevedore, and that, being unable to get work now, he had gone away, and they were thus seeking care.

When we arrived near the alms-house and the older children had alighted, I soon found their familiarity with the place, where they had companions of all grades and ages. It then transpired that it was the habit of the father each fall to disappear from the family, and for all to be transferred to public support. It was evident that the older children were already demoralized by the system and by their promiscuous association. Here was a training system and a training school for dependency and crime—a system sure to secure an increase of ignoble and culpable pauperism from generation to generation. Is it not high time that we stopped forming such iniquity by our laws or modes of conducting such institutions? I have not, in my experience, been half so much impressed by what are generally called the abuses of public institutions as by their wholesale systems of organized injuriousness, by which our alms-houses are oftener the promoters and originators of culpable penury than they are the timely refuge stations of honorable poverty.

Our modes of management and supervision are accountable for the former, and greatly interfere with the chief and grand design of provision for the afflicted and unfortunate poor. While the town or county committee should be in charge of all financial matters, and the body to whom all recommendations should be made, there is occasion that each year some sanitary authority should report the structural and regulative needs of the institution, and another committee give opinions as to what is feasible in respect of each inmate.

The defect is in our general alms-house systems, rather than in any special abuses. We can claim that most of the alms-houses are well kept, in the ordinary acceptation of the term, and would not be criticised by the ordinary visitor, who is only looking for a place where persons have food and clothing enough and a fairly-good bed to sleep upon. But we say that could the improved system of management, inquiry and care be applied in this State, there is scarcely an alms-house in which expenses would not be lessened at least one-third in the next three years, and, in many cases, an amelioration of personal conditions be secured of far greater importance.

The chief modifications would be these :

1. The State Board of Health would be enabled to give such attention to these institutions as that it could make an expert report to the managers each year of all defects in structure and sanitary management, and indicate necessary alterations or improvements.

2. Each township or county or city having an alms-house would have a home committee of two or three ladies, appointed by the State Charities' Aid Association, who, having made themselves familiar with the best views as to alms-houses and their inmates, would see to it that all regulations as to separation, bathing, clothing, occupation, discharge, &c., were carried out, and would, after personal familiarity with the case of each inmate, recommend to the home officers or committee the wisest course to be pursued. We know of a case in which such an investigation as to a single family sent to an alms-house saved a township more than five thousand dollars. I have, by letters from inmates and by my own casual visits, sometimes obtained information as to individuals of much value in guiding as to future management.

3. Provision would be made by which, except under the rarest conditions, children would not be brought up in alms-houses.

There would result a knowledge of the causes of dependency and of the relation of unaided poverty to the pauper element which would be

of great service in conserving the best welfare of our productive classes. We append some statements as to alms-houses more recently visited, which might be greatly extended if our care embraced the entire range of inquiry.

I.

ALMS-HOUSES.

The following is a list of the county alms-houses, including the counties in which not all the townships are represented :

Atlantic county alms-house, at Smith's Landing, near Pleasantville, represents seven townships. Bergen county, Oradell, represents ten townships ; another, in Englewood township, represents three townships ; the two represent the whole county. Burlington county, Pemberton. Camden county, Blackwood. Cape May county, Cape May Court House. Cumberland county, Bridgeton (two miles distant). Gloucester county, Clarksboro. Hudson county, Snake Hill. Monmouth county, Asbury Park (three miles) ; represents four townships in Monmouth county, and two (Brick and Dover) in Ocean county ; another, in Raritan township, represents three townships. Morris county, Boonton (three miles). Salem county, Woodstown (two miles). Sussex county, Branchville. Warren county, Townsbury.

Some of the counties have not county houses, because their large cities have city alms-houses, some of which also receive a few from townships. The following are the chief city alms-houses in counties having no county alms-house :

Essex county, city alms-house, on outskirts of Newark. Mercer county, city alms-house, on outskirts of Trenton. Middlesex county, city alms-house, New Brunswick, two miles from city. Passaic county, city alms-houses, Paterson and Passaic. Union county, city alms-houses, Elizabeth and Rahway.

In other cases the poor are cared for in township houses, or, where there is no house, by boarding out. In Hunterdon county but one township (Raritan) owns an alms-house. In Monmouth county Raritan, Holmdel and Matawan townships have their poor together in an alms-house in Raritan township.

There are eight county asylums, in all cases connected with the alms-house property, except that of Essex county. Those of Camden and Hudson counties are under somewhat separate management. We append, as examples, a few of the alms-houses recently visited.

ATLANTIC COUNTY ALMS-HOUSE.

Smith's Landing.

Atlantic county alms-house. Visited April 20th, 1888. Located at Smith's Landing. Steward, Joseph B. Turner. Physician, Dr. Somers. Large house and sixty acres of land. Number of inmates, eight men, eleven women, no children; three nearly bedridden; one deaf and dumb; three defective. No special inquiry as to vaccination of adults. Bedsteads wood, and much of the furniture unfit. Under-clothing furnished, but not much outside clothing. In some cases the garments worn were too greasy and old for use, and help to make the house uncleanly. No bath-tub in the house. No indoor closet arrangements. No disinfectants have been kept on hand. Outside closets well cared for. No cesspool, but slop and laundry-water runs through open drain out on surface a distance from the house. The wooden drain, and the continuous use of the same one for years, objectionable. Well kept. Water from a good well. Each room should have weekly inspection. As the house is large, every person should have a separate room.

There is a separate part for men and women, with separate stairs, but they have a common sitting-room down stairs, which is too crowded. Should be a sitting-room on second floor for women for sewing, and for being together.

The furnace in cellar does not sufficiently heat the building. While it may suffice for those in bed, the two sitting-rooms each need a stove or other fire. There is a good fire-escape. There are no religious services, and the inmates are seldom visited. Records have been imperfectly kept. A new Steward had just moved in, and seems likely to conduct a thorough administration and oversight. The alms-house would accommodate about sixty. No outdoor help.

Pauperism is diminishing in the county; especially attributed to the anti-saloon sentiment.

REMARKS.—The chief need of the institution, in a structural way, is two bath-tubs for men and women, so located as to secure warm water. Various suggestions as to administration were made to the Steward, whom it is believed will make important changes in the system of care and inspection.

CAMDEN COUNTY ALMS-HOUSE.

One and one-half miles from Blackwood.

Camden county alms-house. Visited April 25th, 1888. Steward, C. F. Adams. Physician, Dr. Brennan. Ground, 146 acres. Buildings, brick—described heretofore. Basement for storage. Bedsteads mostly of iron. Sewers of vitrified pipe and ventilated outside of house; several indoor water-closets—some hoppers; one or two out of order; all inside waste discharged into sewer. Water-supply from Spring Mill brook, carried to top of building; stored in tank. Heating by steam—low pressure; radiators good except that ventilation needs to be carefully looked after, as the system of heating supplies no pure air. A few feeble-minded persons in alms-house. (There is outside help by townships and wards, but not by the county.) Proper separation of sexes. Some of the children have been taken to Children's Home at Camden. House in general good condition. Separate building for hospital; not kept as it should be for a hospital; made too much of a convenience of; bath-tubs are in the hospital; idea of hospital must be more fully carried out; should not be a place for anything else.

Number of inmates, sixty-nine men; forty-one women, including children; twelve grown colored persons, three colored children; twelve white children under ten; most of them infants. Number of births, ten—two of house maternity. Deaths, sixteen. Children all vaccinated. Bathing is required of all persons every two weeks.

REMARKS.—This alms-house has been greatly improved the last few years, and so far as structural arrangement and sanitary care are concerned is among the best.

Asylum on same grounds as alms-house, but different officers, except the physician. Had when visited 106 inmates—forty-four men, sixty-two women. Attendants—matron, two men and four women. There is no classification, except that epileptics are kept separate. Thirty-three patients admitted since May 1st, 1887. Several colored patients.

REMARKS.—Some of the same defects found in most county asylums as to skilled care. The basement-rooms should have plank

bedsteads for those who will not use ordinary beds. The water-closets should have better flush. The sewer should not run to or through outhouse.

CAPE MAY COUNTY ALMS-HOUSE.

Cape May county alms-house. Visited April 19th, 1888. Steward, Eli Sayre. Physician, John H. Hand. Location, about one and a half miles from court-house. High and good location. Sixty acres farm land—200 in all. Soil, loam and gravel. The buildings are of wood and very old, and have been added to from time to time. Walls, whitewashed. House very cleanly and well kept. Many small rooms and winding stairs. No bath-tubs, but keeper particular to have none received until after full ablution. Dish and laundry-water goes on the ground away from buildings. No indoor closet arrangements. Outdoor arrangements above ground and cleansed. No cesspool. Disinfectants are kept on hand—chloride of lime and sulphate of iron. Water from wells. Catch rain-water for washing. Fifteen now in house. Average last year, twenty to twenty-five. About equally divided as to sexes. At present three feeble-minded women. Inmates well fed. Number of poor diminishing with decrease of liquor traffic. There is some outdoor relief—fifty cents a week allowed. Cost per year for out-of-door relief, about \$200. No children born in house of late years. Two children there and sent to school. Five have died the past year, and ten in two years, mostly old inmates. Moral condition well looked after. Funeral services at every death.

The Freeholders are now preparing to build an entirely new alms-house. Had a conference with the architect. Suggested several alterations in plan, but fear the new building will be planned after an imperfect one seen by the committee, and that it will not have some valuable and inexpensive additions.

REMARKS.—The alms-house has been well managed, considering many disadvantages in construction. Several years ago it was far more *patronized* than now. Children were not sent to the district school, but injured by being taught at the house. A great improvement was manifest as they came to mingle with others. It is very important in such institutions that the wife of the Steward be a house-

keeper who has personal supervision of the rooms and the inmates, and that the keeper have patience, diligence and an orderly method of oversight. We see some great defects of management even where buildings are good, but here good oversight, by both the Steward and his wife, has made up for many structural defects.

CUMBERLAND COUNTY ALMS-HOUSE.

A report to the effect that there were an unusual number of deaths occurring, called for an investigation of the facts. The house was found in very good condition, and upon examination of the death certificates no one of the cases could be found which would indicate any bad sanitary condition as the cause of death. Most of the deaths were from old age, and it was only circumstantial that so many had occurred in so short a time. The institution is kept very cleanly and the results of good housekeeping are plainly visible. The chief objections in construction are—1st. Entire lack of provision for the ventilation of most of the apartments, except by windows, which the inmates insist on keeping closed. 2d. No provision for care of wash-water and kitchen waste, except by an open brick drain; this is kept carefully flushed by the Superintendent, but has objectionable features. We have had letters of complaint from inmates.

The asylum connected with the alms-house is in good order, and at the time of the visit contained but five inmates. The outbuildings were in good condition.

GLOUCESTER COUNTY ALMS-HOUSE.

Harrisonville, one mile from Clarksboro.

Gloucester county alms-house. Visited April 24th. Steward, George G. Weatherby, Clarksboro, Gloucester county. Physician, Dr. Staiger, Harrisonville. Ground, high and improved. Building, brick. Walls, whitewashed. Windows, high. Children not vaccinated, but to be attended to this week. Spring and fall house-cleaning, and good weekly care by Steward's wife. Clothing furnished if absolutely needed. Six bath-tubs. Bathing not enforced. Laundry work in wash-house. Basement used for dining-rooms, &c. All slop-water goes into cesspool. The laundry has a separate drain. Cesspool has three outside privies over it—a bad arrangement.

Water-supply—a spring, which feeds reservoir. Pump also used for drinking-water. Have cistern, but don't use it. Ventilation by windows only. Water-closets very good, paragon hopper. Six closets, all in good condition. Heating, by furnace. No fire-places in bed-rooms. Separate sitting-room for men and women, but relation of rooms and entry-ways in basement unfavorable to proper separation. Inmates at present, thirty-two men, twenty women, seven children. In winter more. Five births within one year; two of patients who came within a few months. Ten deaths. There is also outside help by Overseer of the Poor. Inmates well fed.

Asylum, six inmates, all but one able to be around.

REMARKS.—The alms-house is well superintended, and the building for the most part suitable. The basement should be abandoned for present uses, or if not, a much more distinct separation made between sexes. The number of children born here is noticeable. The construction and location of basement-rooms do not admit of proper oversight. The bath-tub and closet arrangements are among the best in the State. House slops should never run into a vault or pit over which outbuildings are located.

MONMOUTH COUNTY ALMS-HOUSE.

Although Ocean county was set off from Monmouth, no division of the alms-house was made. It is owned jointly by Atlantic, Brick, Dover, Howell, Middletown and Wall townships. Three annual examinations of it have been made by Messrs. Hunt, Osborn and Health Inspector Mitchell. That of Dr. Mitchell being the last, we subjoin his report.

The house has been described in a previous report. No provision has been made for ventilation except that afforded by doors and windows, and in cool weather these are kept tightly closed, they being under the control of the inmates, and not being regulated by the keeper. The air in the building suggests the odor from floors recently scrubbed with dirty water. The floors are uncovered, and their wide cracks contain the accumulations of three-quarters of a century. The open crevices in the floor permit the dust and dirt which is loosened and moved during sweeping and scrubbing to fall through upon the ceiling below, and from these sources the offensive odor which per-

vades the building appears to proceed. Wood-stoves are placed in several of the rooms, and they doubtless afford sufficient heat. In the basement are three rooms and a hall. One of these rooms is used as a sleeping-room by one of the inmates of the house. This room is 18 x 18 x 7. It has one door and two small windows. The floor rests upon the ground, and the wood is decayed in places. The air of this room is vile, and although I found the door and windows open, yet the musty, damp, rotten-wood odor was unendurable. I was told by the keeper that the occupant of this room is suffering from incontinence of urine, and he is kept there because he makes a nuisance if allowed to occupy a room near other persons. There are several unoccupied rooms on the second floor of the house, and there is no good reason why this man, if he is decently attended, should not occupy one of these. Indeed, if he was cared for properly, he could occupy a room with other persons without creating offense. The room in which he now sleeps is unfit for human habitation.

The privies, two in number, are situated about seventy-five feet from the dwelling. They have no vaults, but the excreta fall upon the surface of the ground beneath the privy building. They were found with large accumulations beneath the buildings, and water was standing about and beneath one of them. The custom appears to be to throw earth over the excrement occasionally, and to remove the mass in course of time, but the business is neglected, and odors proceeding from these places were abominable. In their present condition and location they constitute a nuisance.

Northwest from the dwelling, and distant from it 210 feet, is a hog-pen 100 feet square. In this pen were about a dozen large hogs. The odors from this pen were as bad as hog-pen odors average. Between the privies on the east, and the hog-pen on the northwest, the dwelling receives odors which, in some seasons of the year and in certain conditions of the atmosphere, must be exceedingly disagreeable, and, in my judgment, dangerous to health.

The water-supply is from a well near the kitchen door. Its surroundings lead me to suspect the purity of the water. I have obtained a sample of the water for analysis.

The number of pauper inmates at present in the institution is twenty-nine. No serious sickness has occurred during the past year. J. Newman is keeper.

SUGGESTIONS.—1. All wooden floors should be removed from the building. The basement floor should be covered with coal-tar concrete four inches thick. All spaces above ceilings should be made clean, disinfected and deodorized. The floors of first and second stories should be relaid with narrow boards.

2. The windows should be kept open, except in extremely cold weather. The keeper should control the ventilation and adjust it to changes in weather.

3. No person should be permitted to sleep in the basement.

4. The privy nuisance should be abated.

5. The hog-pen should be removed to a point at least 1,000 feet from the dwelling.

II.

OUR PRISONS AND JAILS.

It is fortunate that there is no longer so much reason as formerly to argue the importance of giving careful attention to all questions relating to the management of penal institutions. Long ago it was regarded as important to secure safe places of confinement and to prevent such insanitary conditions as would breed pestilence. Some attention was also given to the item of expense.

Now, it is recognized by all intelligent citizens, who have at all thought upon the subject, with the facts before them, that the most of those committed to prisons and jails are there only for temporary confinement. The average of committals to jails, is, we think, from statistics before us, not over from one year to eighteen months. Our penitentiaries do not receive those committed for more than eighteen months, while, in going over the prison list, one is struck by the fact that most average less than two years.

The thousands of the riskful class thus represented, are therefore, for the most of their lives, a part of society, mingling in the daily life of the people. As such, even from policy considerations, they are a class to which the State and the municipality must in their own interest give the most serious and wise attention. In order to do this, there must be experience in dealing with all grades of prisoners or familiarity with the opinions of those who have had such experiences. There was a time when most thought that a convicted person was taken in charge by the State only for punishment. We are wiser than that now, in judgment, but not always in practice. Penology, or

the study of the prisoner, has become a great department of political economy. It has to do with the welfare of society, with the safety of the State, as well as with its finances and morals. We have to deal with the culprit, not only in view of the duty we owe to him, but the duty we owe to the State. That includes far more than punishment. It must include, in most cases, an effort to send him forth from the jail or the prison walls with a will, an effort and a capability to be a better citizen. If we diminish his taste for crime we do something that is good policy. If we even diminish the number and degree of his offenses, there is some gain. If he cease to belong to the criminal class, we do more. If we make of him a productive citizen, we do far more. If we, in one case in a hundred or a thousand, arouse true manliness, and make of him a noble, saved man, a grand climax is reached—one not to be expected except in a small minority of cases. Even that is worth striving for. In attempting it, we strew all along the pathway of society other great and compensating benefits, and do service for God and for humanity.

This is all the more important because so large a proportion are from the young. Mr. Wines, Superintendent of the Illinois Charities, recently states that of the 58,000 persons in prisons in the United States, over one-third are under twenty-five years of age. One-half of all arrests are under the same age. This gives more hopefulness on the one hand, and on the other, if there is not reform or method to prevent repetition of crime, secures us a great aggregate of years to tell against the welfare of society.

We, therefore, now ought to attempt three things with the convicted wrong-doer. First, to punish him; second, to prevent him from being a source of crime by his influence on others; third, to reform him.

As to the first, some great light has broken in. We have learned that there is a science and art and experience as to punishment quite different from the ancient modes of torture. No longer is it advised so to keep prisoners as to undermine their health. That is often practiced, but when brought to light is called *cruelty*, although it is a punishment. No longer do we keep the *long-term* prisoner in sullen silence, for although work is less tedious and less of a punishment to most, it is found that in long-term prisoners the ends of punishment can be best met without enforced idleness.

It has also been found that in order to make punishment more

rigorous and deterrent, it is often better not to limit the term of imprisonment only by the name of the crime, but to let the number of committals also aid to determine the length of imprisonment.

For instance, the plan of permanently confining incorrigible criminals has for some time been adopted by the State of Ohio, where it is said to have worked admirably. Under a law of that State, passed by the Legislature last winter, after a criminal has been twice convicted and imprisoned he is regarded as an habitual offender, and is confined for life, except that after a stipulated term the Board of Managers of the prison have the discretion of allowing him to go outside the enclosure on parole, though he still remains in legal custody and is always liable to be taken back summarily. In other words, the incorrigible or professional criminal is treated as if he were a lunatic, and only permitted to go abroad after long and apparently successful treatment, with the certainty of an immediate return to confinement if he shows his unfitness for freedom.

This method, approved and recommended by the penologists lately in session, has common sense on its side; it ought to prevail in this State. "Now, after capturing old criminals at great expense we send them to prison, a burden upon the State; and after a few years release them, allowing them all the privileges of the honest citizen—except the single right of voting—with renewed opportunity for assailing the peace and welfare of society. This is not only a stupid but a very unjust way of dealing with crime—unjust to the hardened criminal, who needs to be kept from further crime, and unjust to society, which is again in jeopardy of his deeds of violence. The only true way is to capture these incorrigibles and hold them fast so that they can no longer prey upon society, or society be again subject to their lawless violence.

"We kill mad dogs and destroy or securely confine all vicious animals except man; he alone is allowed to shoot and steal, to burglarize, to assault—sometimes to kill. Then when the law officers get him in their power, and the prison walls enclose him, after a few months or years the prison gates are re-opened, and clad in a brand-new suit of clothes he is given the freedom of the republic to re-inaugurate his career of crime. It is high time to change all this."

In the July number of *Harper's Magazine* (1888), Charles Dudley Warner, speaking of the penitentiary at Joliet, Illinois, writes thus:

“I am glad to see that the Warden believes that incorrigibles should be permanently held, and that grading, the discipline of labor and education, with a parole system, can make law-abiding citizens of many convicts.

“In Ohio, since the passage of the Parole act of 1885, 283 prisoners out of an average of 1,300 have been paroled. While several of the convicts have been returned for a violation of parole, nearly the whole number are reported as law-abiding citizens. The managers are exceedingly pleased with the working of the law; it promotes good conduct in the prisoner and reduces the number in confinement. The reduction of the number of convicts in 1887 to 1,300 from 1,400 in the former year, was ascribed partially to the passage of the General Sentence law in 1884, and the Habitual Crimes act in 1885. The criminals dread the first law, because it gives no fixed time to build their hopes upon, but all depends upon their previous record and good conduct in prison; while the latter affects the incorrigibles, who are careful to shun the State, after being convicted twice, and avoid imprisonment for life.”

The reformatory at Elmira, N. Y., under the care of Mr. Brockaway, in ten years released 1,722 prisoners on parole or ticket-of-leave, of whom 1,125 have since been heard from. Of these, fifty-four died good citizens; 830 were living without crime at last accounts, and only 233 had got into prison again or been prosecuted.

This is no doubt a better average than is usual, but such a fact has in it enduring substance for untiring zeal and reasonable expectation of much good.

A medical writer recently speaks thus as to the prisons of Great Britain: “The prison reports have, in recent years, afforded some very pleasant reading, and, happily, the present year is no exception to this rule. The commissioners who administer the local prisons, and the directors who have the eleven large convict prisons in charge, are both able to speak of a continued diminution of the number of prisoners coming under their care, and an almost equal improvement in their conduct while under restraint. The amelioration in the condition of these the outcasts of society, is gratifying in every way. It speaks, as we hope and believe, to an elevation of the whole mass of the population, which has been sufficiently comprehensive to include even the criminal class in its operation; and it indicates also, in a manner still more unmistakable, that a large measure of success has attended the efforts which have been made in recent years to improve and perfect our prison discipline. From a sanitarian’s point of view

also, the results now shown by our prison management afford legitimate grounds of satisfaction."

So, both in principle and practice, indeterminate sentences, or the leaving the term of confinement at the determination of the Judge, in cases of repeated crime, have been found both punitive and corrective. Then again, the Crofton system, one of the provisions of which is abbreviation of the term of imprisonment by reason of good conduct, industry, &c., has been found not inconsistent with proper punishment. (See Miss Mary Carpenter's Outline as printed by New York Prison Association.) The element of hope, and the principle of earning a rebate, if not carried too far, do not so much alter the punitive benefit of the sentence as to work injury.

Thus far, the advocates of modification of punishment have, except from the most exacting, escaped the charge of sentiment or sentimentality.

Strange to say, those who, instead of directing their attention to shortening punishment, have advocated all the three methods before named, have often been accused of *sentimentality* or *sentiment*. This has arisen slightly from the fact that sentimentality does sometimes prevail among a few of those who visit prisons and jails. But it is noticeable how little of it is found among those of thought and experience who are recognized as authorities, and who really give direction to correct views. Those who lavish attention on condemned criminals, are not those who, as good citizens, have studied prison life and how to deal with it, but those who, without experience, are moved by excitement or pity.

Another reason for this incorrect view is that so many confound *sentiment* and *sentimentality*. *Sentiment* is not gush. It is not feeling only. It is *feeling which gives rise to thought*. It has no other definition. It is reason. The heart can prompt to reason as well as the head. He who would blot out sentiment from the management of anything human is worse than a stoic. Sentiment is the sincere movement of thought, which in its start is impelled by feeling. Sentimentality is the unreasoning, illogical outcome of unbalanced feeling, and as such is artificial and unsound. Sentiment is one of the higher powers. Sentimentality is one of the lower weaknesses.

The citizen of any degree who nowadays conceives of a prison or a jail as only a place for punishment, and frowns upon those who, moved by feeling into thought, devise methods of reaching the pris-

oner so that he may not corrupt others, but may be possibly reformed, is himself the victim of a sickly sentimentality. When, in 1877, Parliament regulated and unified the prison system of England on this broader basis, and when, as since, it has applied also other advanced methods, it has done it because true sentiment, real experience and wise statesmanship have conspired to recognize the principles now seeking to be applied in the management of prisoners and of all penal institutions.

By the common consent of all students of the subject and of practical workers among prisoners, the two additional objects alluded to, viz., the dealing with the prisoner so as to make him the least possible source or occasion of crime to others, and an attempt in the direction of possible reformation, are included in all intelligent schemes of prison and jail management.

How enormously the prison and the jail may become the source or occasion of greater crimes to the young, or to those who have offended in smaller matters, as well as to those outside, who are afterward exposed to their malign influence, we shall hereafter have occasion to illustrate. On the other hand, the evidence is abundant that wise and intelligent dealing with the most of prisoners can do much to lessen their influence for evil over each other and over other members of society, when they return to it, as so many do so soon.

As to actual reformation and abandonment of criminal life, the general public are and always will be suspicious and misgiving. Wise laborers in the cause of this reformation know that they have many disappointments. But surely the combined testimony of these laborers should be accepted, as they are in accord in witnessing that results, even in this direction, are sufficient to fully repay the efforts which have been made.

His Excellency Governor Green, in his recent message, has expressed very forcibly similar views. He speaks thus: "It is not punishment alone, with its salutary lesson of warning to others, that is to be accomplished by a perfectly-constituted penal system. The reformation of the criminal is not to be lost sight of in securing the safety and well-being of the community. So long as the convict is capable of improvement, he should be the object of proper means to effect his reform. There are two classes of criminals to be dealt with—those who, by proper care and treatment, may be reclaimed, and those who are incorrigible. As to the latter class, penologists are, at

present, of the opinion that their term of imprisonment should be for an indefinite period, to be released only on satisfactory evidence of thorough reformation.

“As to the other class the problem is more interesting and difficult. Statistics show that the average age of the convicts in the United States is a little over twenty-six. The majority must, therefore, be mere youths. If the boy, led astray by evil associations or unchecked vice, or the man who, in some sudden passion or through unfortunate indulgence, commits serious crime, and is convicted of that which is his first offense, he will, under our present system, probably, and properly, be sent to the State Prison. He is there brought into daily contact with the hardened criminal, and on the expiration of his time goes into the world, not only with the disgrace of his imprisonment on him, but his moral system poisoned by the associations in which he has been forced to live. It will be a miracle if that youth or man ever becomes a useful member of society. Our system is behind the position of enlightened thought and experience upon this question.”

It is not the design of this article to discuss the whole subject of prison and jail management. But thus much has been said in order to outline, in some degree, the importance of the subject, and what is sought to be attained.

We shall consider prisons and jails with reference to the interests of this State. While pointing out some of the good features of our system, the chief design will be to direct attention to defects, and to indicate what improvements can be made.

It may as well be said just here, that what we have to say is not at all in criticism of the faithfulness or ability of most officials. Indeed, as a rule, representations as to neglect or cruelty are the offspring of ill-founded sentimentality, or very inadequate knowledge of facts. We often find prison and jail officials ready to respond to criticisms made, and themselves more than any others, feeling the defects of the system under which they are compelled to carry on their service. We shall speak separately of the prisons and the jails.

Under prisons we include the State Prison, at Trenton, and the Penitentiaries of Essex and Hudson counties—the one located near Caldwell, and the other at Snake Hill. The three may, in general, be said to represent an average of 2,000 convicts. Of these the sentences of one-half do not exceed eighteen months, and of the other

half, if we except a very few life prisoners, the average of incarceration is not over two and one-half years.

This at once presents to us the oft-forgotten fact, that the prison and the penitentiary are only very temporary places of detention, and that their inmates are, for a good part of their lives, a part of the general constituency of the State. As such, both policy and principle compel us to take a deep and well-planned interest in them.

As to our prisons in a sanitary aspect, the chief defect is want of air-space. Cells intended for one or two, come to be used for three or four, and the area of corridors is not sufficient to relieve the closeness. Foul air always has its effect on general conditions of health, besides adding to the irritability of many of those exposed to it.

There is too often defect in the medical and sanitary system. Physicians are too frequently chosen from some special consideration, and not as a result of competitive examination or peculiar fitness. Their duties become those of routine, and do not, as they always should, include a thorough knowledge of the details of sanitary inspection, and of the mode of preventing and correcting evils. Every prison needs the frequent expert visits of the physician as a sanitary inspector. Not long since, in order not to be intrusive or over-critical, we had to submit to the view that the burning of coffee every morning was a complete disinfectant. No doubt its aromatic odor is good, and it may not be objectionable if it is not used to conceal odors which would otherwise be intrusive. The work of the inspecting expert is not to admire the general order and cleanliness, but to pry into hidden corners and to inspect out-of-way places. While there is general vigilance, we are not aware that in our prisons (in which we include the penitentiaries) the physician either makes such inspection or is held accountable therefor.

Some recent English and Scotch enactments in these regards are very technical, and require of the medical officer in charge knowledge as to many details in respect of the prisoner and the place of confinement. Here is an instance :

“The Secretary of State for Scotland has just issued a new set of prison rules, in which the duties of the medical officers of Scottish prisons are, among others, very carefully and minutely set out. In the main the duties thus defined coincide with those of medical officers in English prisons, but in one or two particulars the new regulations enlarge the medical man's responsibilities. Thus, he is

charged with the care not only of the prisoners, but also of the families of officers and servants of the prison. He is also made responsible for the preparation of an indefinite amount of statistical matter at the direction of the Commissioners. He is required, like his English *confrère*, to make a quarterly inspection of the prison premises, and in addition to this he is frequently to examine the 'washing-places, baths, and other provision for the purposes of cleanliness and sanitation, and see that they are in efficient working order.' The inspection of the food supplied to prisoners, both when cooked and while uncooked, is specifically prescribed to him. The regulations relating to the attendance of the sick and the weekly visitation of prisoners in good health are practically the same as those which obtain south of the Tweed, but the new Scottish regulations also direct the medical officer to examine the prisoners from time to time during their employment at labor, with a view of satisfying himself as to their fitness for the tasks imposed. He is also to be consulted in every case where it is proposed to subject a prisoner to close confinement or to dietary punishment, and his sanction is only to be given after personal examination. So far the duties of the medical officer are offices of mercy intended to mitigate the severity of punishment, and in England his whole duty may be said to be comprised in that description. In one particular, however, the medical officer of a Scottish prison is to be pressed into detective service, for it is now defined as a part of his duty to report to the Governor of the prison any mark which he may observe on the person of a prisoner capable of serving the purpose of identification. Thus it will be seen that the new regulations have been prepared by the light of past experience, and give a very detailed view of the functions of the medical officer of a prison. The tendency of the time undoubtedly is to attach increasing importance to the due discharge of these functions, and we believe it will be found that greater attention to the health and sanitary surroundings of the prison population, far from diminishing the efficiency or the effect of prison discipline, will powerfully assist those influences tending to reform the criminal, which it will be the aim of all enlightened legislation to strengthen."

Of all others, the prison physician should realize that to be a physician is not necessarily to be a sanitarian, and he should make the technical sanitary care of his institution a subject of special study, and of special application of that study.

The next great defect in prison management is in the absence of such systematized reformatory oversight of prisoners as seeks to make them less of a peril to society, and, if possible, to excite the nobler instincts of their natures toward a desire and an effort for reform.

To the general citizen a prisoner is a prisoner—a criminal. It is

forgotten that numbers are imprisoned for minor crimes, that do not denote them to be hardened offenders. Young men are sometimes led into an affray, and get in other serious offenses against the law, much out of accord with their general orderly obedience to law. There was often no deliberate malintent, although criminal conduct which merits punishment. Every man or woman placed in prison should early fall under the inspection and acquaintance of some one whose business it is to look after the idea of moral restraint and improvement. Many a person in prison is placed under the most favorable opportunity that ever has occurred to him for an effort to be made for instruction and reclamation.

We have had to do with some of those skilled advisers who, from experience, have come to be as expert in this business as is any merchant in the line of his work. Such do not patronize prisoners or crime. They come to know which are the hardened and the hopeless, and often advise punishments more severe and sentences more prolonged. They also come to know the large possibilities of arousing manliness in others; of showing them the folly and the ill-policy of their action as well as its wickedness; of suggesting to them other means of livelihood; of aiding them to such knowledge and giving them such training as will fit them for honorable industry, and guard them from besetting temptations. It is true that there are not very many fitted for this discerning work; but the man or woman of heart, of sympathy, of interest in prisoners, of such mental vigor and skill as will guide the heart by wise judgment, is indispensable in the care of prisons. Our State seemed to have some conception of this when it used the name "Moral Instructor" instead of Chaplain. But however important moral instructors may be, unless they can give their whole time to this duty, and put themselves in relation to each prisoner, they cannot do this work. As a rule, it can be better done by some one selected with special reference to this special care. The keeper of the jail in Edinburgh told us that a woman who accompanied us in a visit to each cell had been in this capacity for more than thirty years, and had not only greatly aided him in discipline, but had been of most signal advantage to prisoners in the way of instruction and reform.

No one can read the yearly records of the Prison Association of New York without perceiving the great wisdom of this work; for besides the occasional radical and spiritual change brought about in

some, it must be remembered that the recovered manhood or the politic abandonment of crime or the diminution of the relish therefor, means large moneys saved to the State, and a labor for the good order of society. Without it, mere imprisonment is not the sovereign means that some imagine, for the securement of obedience to law and good order. It is thoroughly feasible that such of the 2,000 convicts of this State as have a ray of hopefulness in their characters, should be reached by the State in this way. So long as they are not, it behooves patriotic, State-loving and hearty men and women to combine to accomplish, in a voluntary way, that which is entitled to be arranged for, as a part of the political wisdom of the State. It is within our knowledge that the Keeper of the State Prison, at Trenton, is in full and intelligent sympathy with these views—that he has himself done something in this direction. He well recognizes that any system of dealing with prisoners is faulty that assumes that most of those incarcerated should be looked upon as hopeless criminals. In the interests of the State, they are to be regarded as capable of improvement. We believe the same will be found true of the penitentiaries, when the attention of Governing Boards is enlisted. It is not the pietist or the cold reprover that is needed, but the man or woman who puts himself or herself in relations of confidence and sympathy with the prisoner, that has a Christian heart guided by thought and judgment—believing in punishment, yet not swayed by mere feeling on the one hand, or by inexorable justice on the other.

Akin to this need, and one properly committed to the same persons, is a systematic provision for *discharged criminals*. Phillips Brooks, of Boston, in a recent reference to the Discharged Prisoners' Aid Society, well says: "I think there is nothing in the prisoner's whole history which so appeals to us as his position when such a society seeks to look after him. In it is the sole resource of many a poor creature, standing in what we may deliberately call *the most forlorn and desperate condition which civilization has to offer to a human being*—the position of the discharged prisoner. Without such a society there would be little hope."

Yet, this State is to be pitied that no such provision is made. A prisoner who has formerly resided in New York State, when he leaves our prison has an invitation to come for aid to the Prison Association, but no such boon is offered here. One keeper has told us of cases under his own knowledge where there was apparently an

honest intent of reform, and where such a society might have availed to save the outgoing man from his old associations and temptations.

If there is a proper study of cases in prison ; a preparation for freedom ; a planning with the man who would forsake his former life, so that he can be rid of former influences and enter on an industrial life, and if, then, there is some person or some society ready to receive and guide him, we have a method of saving, most hopeful in its results. While here we must trust to voluntary co-operation ; if the State prepared the way by proper aid during prison life, we doubt not such a society would soon be formed. As it is, many a discharged prisoner can only look out upon his new liberty as upon a friendless world, and with no one to guide or aid him, he is shown the first token of sympathy and companionship by those who are quite sure to get even the pittance given him on discharge, and prepare him soon to fall amid the desperation of hunger or the hopelessness of a forsaken life.

Other considerations as to our duty to the prison population might be named, but so long as the beginnings of effort should be with these, what has been said will suffice for the present.

We now turn to consider our own jails as to structure, &c. ; what they are doing as to punishment ; as to preventing one from misleading or hardening another, and as to the reformation of the individual.

STRUCTURE OF JAILS.

It is well to premise that so far as structural arrangements are concerned, the twenty-one jails of the State differ very much. While it must be said of most of them that there are times of overcrowding, the jails of the smaller counties do not suffer much from this ; yet some of these smaller jails are very defective in construction and in sanitary and other care. When we visited last the Sussex county jail it had but three prisoners in it, and yet it was found in a very insanitary condition, and the prisoners themselves filthy. The same has been found in other small jails. That of Cape May county, after much urging, was overhauled at moderate expense. After it was done, and the foul accumulations under the iron floor removed, no one doubted the necessity. Even where jails are roomy we now and then find two or three allowed to occupy the same cell for company's sake. So, with plenty of room, these cells are close and badly kept.

JAIL INSPECTION.

The one thing most apparent is the want of orderly inspection. We have revealed to many a keeper some nuisance existing for weeks and entirely overlooked because he had put matters in charge of some one else, and had not made his own weekly inspection into every corner and examined the closets and water arrangements to see whether they were in order. There is no substitute for this inspection. Where the evil is pointed out it is generally remedied, but will not stay remedied unless there is stated inspection also. We are always able to secure minor structural improvements, the only reason for wrong conditions generally being because no one has called attention to them.

Some jails, like that of Union county or Gloucester, are models of construction, fully equal to the best knowledge at the time they were constructed. Even in such, slight improvements are often suggested with advantage. Burlington county jail has recently been much improved, although still quite defective. The worst jail of the State, and probably in the United States, is that of Camden county, but the Freeholders have recently voted \$10,000 for its improvement. It should have been forever abandoned as a jail. Here is its record for January, in the year of our Lord 1889:

There are ninety-two prisoners in the Camden county jail, with twelve cells, seven by nine feet each, to accommodate the eighty-five male prisoners. A narrow space between the north and south tiers of cells is full of tramps committed under the Vagrancy act.

There are nineteen women, black and white, of all ages and nationalities, in one room, about twenty by thirty feet, in the Camden jail.

CONSTRUCTION OF NEW JAILS.

As to the construction of new jails or important alterations, they are too apt to be arranged for on the basis of some two or three jails viewed as models by those who have had no experience in building jails or who do not know of the most recent improvements. In all cases the local authorities, having determined as to the expense,

expert advice should be secured as to mode of construction. The greatest defect of all is overcrowding from inadequate room. Proper air space is not less important for good discipline than it is for the teaching of cleanliness and the preservation of the public health; for it is to be remembered that the actual sickness or number of deaths in a jail is not the measure of its unhealthfulness or of its effect on community. Many with very short sentences keep around while in the jail, and go away to be sick in alms-house or at home, or by going in their filthy condition to some insanitary locality, add to its filth and sickness, or even carry the seeds of epidemic disease.

PERSONAL CLEANLINESS.

In most of the jails there is inadequate provision for face and body washing. Most of the jails furnish no towels. The discipline of any well-managed jail should enforce cleanliness of person on all those detained long enough to deal with them. The washing of clothing is generally done in the bath-tub, and there is steam and odor therefrom through the corridors and cells. Generally, persons are allowed to wear the same outer clothing with which they come in, however soiled. It should always be fumigated, and in some cases another very inexpensive suit provided. This is always done in well-managed jails, on the ground that in the end it is a true economy.

BEDS AND BEDDING.

There is very much neglect as to the beds and bedding of jails. In many cases wide planks fastened to the wall and capable of being turned up against the wall in the day-time answer better and can be kept cleaner than any other form of bedstead. Straw, if changed very frequently, and cheap ticking that can be thrown away when not admitting of washing, answer best for the beds, together with a blanket that can be washed. The jailor, as a rule, will always tell you that cleanliness is an impossibility, but the transformations made in English jails which we have visited, and in some in the United States, show it to be so far attainable as to be a feasible educational and economical process.

FOOD AND DIET.

We purposely do not speak in detail of diet, since no starvation system is adopted in our jails; yet all our larger jails should have a regular dietary. The fact that the daily allowance for food per person varies from eleven cents to thirty-five cents per day (these two instances being in adjacent counties, where there is no need for the least variation), shows on what a loose basis the food system is conducted.

PRISONERS IN JAILS.

We now proceed to consider the jail prisoners themselves. They consist of various classes—(a) those committed by justices; (b) those awaiting trial in the higher courts; (c) those found guilty and sentenced to jail; (d) those found guilty and awaiting transfer to prison, and (e) those detained as witnesses.

It is with the first class that the great demoralization of our jails begins. As we come to consider the jail as a place of punishment, we find facts and the testimony of experience to be, that to the large majority *the jail is not a place of punishment*. This arises from the desultory and varied ways of commitment and the promiscuous congregating of those committed, so that very many go to jail to avail themselves of congenial society, and housing and food without any expense to themselves, and because they find it the most convenient way of spending a part of their spare time. Said an experienced Sheriff to us, "Few know the social charms of the jail to most of its inmates."

JAIL ASSEMBLIES.

It is this *congregated system that is ruining the morals, the discipline, the sanitary condition and the punitive and reformatory designs of jails*, and rendering many of them a greater menace than they are a protection to society.

It is now a settled view, with advanced thinkers and workers and with practical men in charge of jails that have adopted the system, that *all persons committed for brief periods or having occasion to wait only a brief time for trial, should have separate confinement*. It is of itself far more of a punishment as well as an aid to accomplish the

other two designs, viz., the prevention of evil influence to or from others, and the affording of better opportunity for reformatory methods.

A recent English writer speaks thus: "There is a duty which society owes to them and cannot justly evade, and the treatment to which they are subjected in confinement must be directed not less to the reformation of criminals than to the repression of crime. For this purpose separate confinement is the most powerful engine which society possesses. It does what nothing else can possibly effect in the way of preventing that intercommunication by which the corrupting influence of the most vicious among convicts is brought to bear upon those of less deteriorated character, and it renders the prisoner more accessible to the improving influence of the schoolmaster and the chaplain. Thus is the efficiency of prison discipline improved and its cost proportionately diminished, since the risk is lessened that any particular convict will descend to the rank of the habitual criminal, and the end aimed at by the punishment becomes attainable in a shorter time."

REMEDY.

The first step toward this must be made by relieving the jails of commitments for vagrancy, drunkenness and such other offenses as are naturally classed as minor. We have over and over again seen the effect of this demoralization which the Sheriff, Warden or assistants are powerless to prevent. Here is a jail with sixty cells and corridors to correspond. The corridors were not provided originally for congregation, but for light and ventilation to the cells and for such silent and orderly exercise as may be deemed necessary, by marching and countermarching in the presence and under the direction of the keeper. These sixty cells are in fair proportion to the average needs of the county for all the more serious offenses. But fall and winter come. Three or four or ten tramps are arriving in the villages or in the county town each day. They are vagrants. Some of them get drunk and are disorderly. In addition, some well-known drinkers indulge too much and may get into a brawl in which no one is seriously hurt. There is pecuniary motive on the part of the constable, the justice and even others to have them arrested. One officer gets twenty-five cents and another fifty, and the keeper of the jail is allowed from twenty-five to thirty-five cents a day

for keeping him. These are the kind of commitments that pay. A vagrant brought in at ten o'clock at night on Monday and discharged at ten o'clock in the morning on Wednesday counts three days. Often he has eaten nothing. In one county an incensed Freeholder offered \$3,500 for the privilege of being Warden—at least, such is the newspaper statement. Vagrants, and all these minor offenders, need attention, and often need arrest, but they do not need the bars of a jail, or such jails as they are sent to. They belong in the station-house or in a work-house, or, if sent to jail, it should not be for companionship, but for punishment. This past year, in the spring, when the farmers had begun work, I visited the jail of Burlington county. Besides others in other parts of the jail, I found in one large room in the basement forty-three committed persons. I asked all of those who had been born in New Jersey to raise their hands. Two white men and one colored man claimed birth in New Jersey. Others hailed from various States or foreign countries. It was evident that most of them had not resided long in New Jersey outside of jails. The customs of our counties differ. On my first visit to Camden alms-house it was keeping for the winter over 100 tramps. Typhus fever broke out, and the Freeholders broke up permanently the plan of housing tramps in the alms-house. The next-best shift was to get drunk, to be disorderly, or to commit some small theft and get committed to a county jail. Tramps often adopt this as a settled plan. Tramps that have not been in jail are scarce.

As to all of our jails, there should be some uniformity of inquiry and method. A vigorous system, a refusal to receive to overcrowding, separate confinement and a plan of work, would lead the majority to seek quarters outside of the State, and so largely reduce county expenses. We see no possibility of building jails large enough for proper keeping so long as they are liable to the unnatural overflow of vagrancy and minor disorderly conduct. By the present system there is every inducement in many of our counties to arrest and detain for very minor offenses, since this increases the incomes of various officers. On the other hand, those arrested gladly aid in the arrest, and if the commitment is not long enough, repeat the occasion consecutively, so as not to lose their housing and food and congenial society. But alter the jail into a place of separate confinement and much of this would soon cease. We know of one Sheriff who voluntarily made the separation, putting tramps and those charged with very light

offenses in a separate building. He had to allow these to be together, but by this means preserved the discipline—improved the care of those sentenced or of those awaiting trial in the higher courts.

Counties should not have to bear that portion of the expense for city vagrancy and disorder which belongs to the municipality. As it is now, the station-house keeps them but for a night, and the jail or the alms-house is made the more permanent resort.

We speak after careful observation when we say that there are at least five counties in the State in which the expenses of keeping jails and of the trial of offenses would be lessened one-half if the assembly system of keeping prisoners was broken up.

It is not only that this system goes far to mitigate the punishment. Young persons, and even children, who have been led into petty crime, are brought under influences which tend to identify them with the criminal classes. We have witnessed the contrast. We have seen, in the one case, a young man in brief solitary confinement, brought under the best influence of sympathy and control, so that he could leave his cell ashamed of his fall, without demoralization from others; with his manliness aroused; with his self-respect returned, and having received such instruction, advice and aid as would lead him into proper conduct. On the other hand, we have talked with the child, arrested in winter for stealing an armful of wood, who, for days, had been subjected to the vilest influence, and who, even while showing his shame and sorrow to us, has to submit to the jeers and jibes of old culprits in the jail. Do not our manhood and our statehood revolt against such mode of dealing with such a constituency? Recently I got a Freeholder of a county to go with me through one of our most crowded jails, and pointed out to him the defects and a more excellent way. He was reticent, but evidently felt that he ought to have known more of the condition of affairs. On leaving me he simply said, "If this July day the jail doors were opened and all ordinary prisoners allowed to go, I believe less harm would be done to society than is now being done by the present system of detention here."

The jail marks the nearest approach we have to the beginning of vice where it comes under civil restraint. If only it were a place where real punishment could be felt; a place where the arrested one was preserved with astute care from further demoralization, and a place where the prudent man or matron could seek to aid in reforma-

tion, we should have different results in jail life from those now deplored.

But how is any or all of this to be accomplished?

I. By a sedulous and organized effort, on the part of good citizens, to inform all as to the facts, and to make a correct popular opinion.

II. By such intelligent supervision as avoids captious fault-finding, but prompts to and aids in all possible improvements, at the same time making the best of defective systems as we find them.

III. Such legislative enactment as will prevent the overcrowding of jails and as will compel the due separation of jail prisoners into classes and *separateness* of confinement for at least the first three months, and for most of the other time where sentences are less than twelve months.

IV. By vigorous work on the part of the State Charities' Aid Association and its auxiliaries in securing such local expert oversight as is now authorized by law, with a State allowance to the association for actual expenses as fostering voluntary aid.

V. The continued work of the State Board of Health in looking after structural and administrative sanitary requirements, both as relating to buildings and to individuals.

The Secretary of this Board has for over ten years had occasion to visit the charitable and penal institutions of the State. With this, as only one amid manifold other duties, it has been impossible to give to them the tithe of the attention which their importance and their needs demand. As the duty had special reference to sanitary conditions, it was only incidentally that it became necessary to inquire into individual cases, and to discover defects which relate to correction and reform. With an interest in this care of the dependent and penal classes, and with a recognition of its important bearing on State interests, he has not been a thoughtless observer. It has also been his privilege to visit English, Scotch and Irish institutions, and to consult with those of large experience, both in this country and abroad, as to what is feasible and what is public interest in the prevention and care of pauperism, and of the various grades of criminals. It is not, therefore, presumptive that I claim to have a zeal somewhat according to knowledge. It can no longer be called only the work of the Christian philanthropist. While all such work must have its basis in the principles and practices of Christianity, in conscience, in sympathy, governed by prudent and intelligent thought, yet it is so much a *citizen's* question, a patriot's

question, a financial question, and a question that belongs to all real manhood and womanhood, that we plead for it attention and earnest provision, with all the earnestness with which we plead for the dearest interests of individuals and of all society. The ordinary citizen has not been aroused only because he does not know the needs. The Managers, Directors, Freeholders and Committees of alms-houses or jails are often as ignorant of the real needs and the great possibilities as any others, because they only give official attention. Faithful, it may be, as to all financial and political aspects of their office, and in correcting the most obtrusive and pronounced evils, they have neither time nor a sense of the need to study the details which have to do with more permanent reclamation and with the diminution of these evils. Yet, when real defects and the possibilities of a different dealing with inmates have been pointed out, and their results in other institutions cited, we have generally found some ready to admit the faulty character of present methods, and the importance of State direction, and of organized plans for the diminution of the alarming and increasing number of the dependent and criminal population.

We, therefore, appeal to citizens in their respective localities to inform themselves and to interest themselves in this great and pressing need, to voluntary societies to organize, or if already organized, to work on with prudent and enlarged methods for reaching these classes and for educating public opinion; to the varied branches of our State government for such legislative, judicial and executive provision as shall add wise statesmanship, to the individual or combined effort of the people. We have talked with Governors, with Judges, with legislators, who are earnest in feeling that something needs to be done. We now beg for that activity which results from insight, and for that systematized provision which will prevent institutions meant to care for pauperism or crime from becoming their allies and the very cause of that which they are designed to limit. Thus, by distinguishing between that alms-giving which relieves, and that which causes dependency, as also between that correction which punishes and seeks to reform, and that other kind which converts punishment into degraded social assembly, into opportunities for educating the recent transgressor into hardened crime, and which precludes any intelligent effort at reform, we shall help to stem the current of increasing demoralization. In thus dealing wisely with our unfortunate or hazardous classes, we conserve the highest social and economic interests

of all citizens and of the State. It is for our common safety and security, the demand of patriotism, no less than of humanity, and of sound morality.

SOME OF THE JAILS VISITED.

We append, as examples, a notice of a few of the jails more recently visited.

ATLANTIC COUNTY JAIL.

Mays Landing.

Visited April 19th, 1888. In charge of Sheriff S. E. Johnson and of his assistant, F. R. Moore. Sheriff resides in the building. Buildings are owned by the county. The grounds around are ample, and contain other county buildings. Jail is built of stone. Length of two corridors, fifty-five feet; width, six and one-half feet. Four windows each side. Cells on first floor, one side; on second floor, the other side. Ten cells. Cells, eight by ten; ceilings, eight feet. Unlike most jails, it is fullest in summer, on account of commitments from Atlantic City. Sometimes four in a cell, but generally only two. Cells in good order. Ventilated through corridor. Heater in cellar, but not enough to heat jail well in cold weather. Found in jail one man and two women. The two women were allowed to occupy the same cell. Clothing is provided when necessary. Towels provided. Laundry work is done outside, which helps much to keep the jail cleanly. Those in jail are fed in the corridors. There are no bath-tubs or facilities for bathing. Two water-closets; pan variety and very poor. The sewage from jail is carried to an outside cemented cesspool, which is emptied as occasion requires. The frequent emptying is a nuisance. Slop-water and pump-water from kitchen should not go to it, and it should be emptied at night. The sewer is not ventilated between jail and cesspool. There is no trap on pipe leading from kitchen to cesspool. The jail could be put in good order at little expense. The present closets should be replaced by two automatic hopper washout-closets, and one or two bath-tubs provided, with hot and cold water. One would do, as where there are so few prisoners, they could be locked in cells when desired, and use the bath-room in turn. There is a good water-supply, both by cisterns in attic and by pumping up thereto when needed. Cisterns have been cleansed.

Roof, cedar shingles, painted. Jail much improved since my last visit. No fire-escape, and none needed, No lights allowed. One witness detained one month. Kept separate, and allowed fifty cents per day during detention. Fifty-seven prisoners in all, the last year. Only one re-commitment. Two-thirds are small-offense cases, or justice cases, and not court cases. Sentences from three days to six months. Tramps are not sent to alms-house, but committed as vagrants. Have had five persons under age here the last year; one, a court case—boy, aged twelve years; here six weeks, and sent to Reform School. One, a girl, aged thirteen, committed as a vagrant and kept sixty days. One, a bad boy, deaf and dumb, aged eleven years; here from June 15th, to December 13th, and then sent to asylum by order of the Judge. One, aged seven years; sent by justice as a vagrant, for thirty days; taken to Reform School, but sent back from there because under age, then let go. Next, a girl aged fourteen (colored), committed for ten days. One case of holding for support of child; the property not being enough, held the body. Freeholders may discharge. Tramps not received unless committed as vagrants. At Atlantic City, if they find vagrants, they take them away under the Draw-Bridge act, beyond city limits, and warn them not to come back. The committals as distributed for the year were as follows: May 3d, June 7th, July 11th, August 9th, September 6th, October 4th, November 6th, December 5th; 1888, January 1st, February 2d, March, none, April 3d. Not much visiting of prisoners for their instruction or reformation. Newspapers allowed.

REMARKS.—Have reason to believe that the structural defects will be corrected. There is much food for reflection in facts here given as to those held, and as to modes of dealing with vagrants.

BURLINGTON COUNTY JAIL.

Mount Holly.

April 10th, visited Burlington county jail. Sheriff, Geo. F. Harbert. Assistant, Thomas Taylor. Turnkey, Thomas Harbert. Location, Mount Holly; well located on high ground and dry soil. The buildings are of stone and were built about A. D. 1800. The walls are plastered against the stone, and the floor is brick and often damp. Formerly the jail had no beds, but now iron bedsteads are in

most of the cells. There is a bath-tub in each ward or corridor. The laundry work is done by each prisoner for himself. In the basement, where there are no bath-tubs, the prisoners have large pots in which they heat water for washing clothes. Inmates march out to get their food twice per day, and then eat in their cells.

There are three stories of cells, as follows: Basement has only four cells, and then a large room with fire-place and fire. The basement is kept for non-court prisoners put there on justices' commitments, such as tramps, vagrants, drunkards, &c. The first floor has eight cells and the second floor eight cells. The other wing has also cells, and now the jailor has vacated his apartments, and there will be a fitting up of these, so that about ten more cells will be added.

Another visit was made August 27th, and improvements were nearly completed. The general size of cells is eight by eight feet, ceiling being seven feet and then semi-circular. The number put in them depends on number in jail. The average number in the jail is about fifty-five, and for the three months of winter from 125 to 150. They have two meals, and the expense of maintenance allowed Sheriff is twenty cents per day. The average of court prisoners is about twenty. At least two-thirds are small-crime or vagrant prisoners. All tramps come here. If a vagrant or drunken man is found on the streets he is taken to a justice and committed to jail for from five to ninety days. They are never sent to the Overseer of the Poor. Court prisoners can be kept here six months after sentence.

The water-supply is sufficient, being from the public water-supply, except that in the upper part of building there is often deficient head of water.

The water-closets are of two kinds—one that flush themselves in the use and are in the cells; others that flush only by turning of a faucet. The latter are to be condemned. There are three water-closets on each floor. All the inside sewer-pipes connect with a drain sewer that runs direct to Rancocas creek. There are two outside closets in yard that are emptied as occasion requires. The building has no fire-escapes. The dietary is sufficiently good—bread, coffee and syrup in morning, and various forms of soup and meat and vegetables for second meal. Where work is done a third meal is allowed. Once carried on stone-breaking, but at much loss. Male and female jails are entirely separate. Average of females not over ten—one was detained as a witness. There were no children in the jail.

Tobacco is not furnished. Lighting is by gas in part. No lights are allowed in the jail. Clothing is issued as required—as it seems to us, properly and with good judgment. It is inexpensive and promotes cleanliness. Towels are not furnished as they should be. They can be of coarse muslin and cost little. The heating is by furnaces, and in the basement by a large fire-place and fire, which aid much in ventilating the basement. Depend on window ventilation.

The disinfectant used is chiefly carbolate of lime. This is a manufactured article and could wisely be replaced by well-known simple disinfectants.

There is preaching each Sabbath and visitation by women with books, tracts and papers.

REMARKS.—This jail has been improved much in its management, but still needs some changes in its structure which would not be expensive. There should be iron bedsteads throughout. All the faucet-closets should be replaced by a few self-acting. The bathrooms should be made better, so as to secure greater cleanliness. The Sheriff and his assistants seem to us to have reasonable views as to what is needed and within the bounds of a proper economy. In the addition made of new cells, there should be skilled oversight of the alterations.

The ventilation of the jail is much better than that of most of the older jails. The value of the large fire-place in the basement is great in this respect. There should be some new stalls or cells, made small enough to secure separate confinement for all short-term prisoners. The Sheriff now separates between court prisoners and others, and does wisely in this. But the others, which make up the bulk of the jail population, have too much of a social gathering every day. If all these could be separated it would diminish attendance more than any other plan, and the profit would more than pay for the cost of fitting up. A man could safely offer to pay for all the expense of alterations for separate confinement for justices' commitments if he could be allowed for five years the expense that would be saved to the county.

CAMDEN JAIL.

This institution was visited March 10th, 1888, for the purpose of ascertaining whether any improvement had taken place. All the un-

sanitary conditions which had prevailed were still existing, *i. e.* overcrowding; lack of sunlight; lack of ventilation; lack of proper bathing facilities; no towels provided for the prisoners, &c. In fact, the location, construction and management of this institution can only be totally condemned.

The Secretary again visited the jail April 25th, and found no improvement in its condition. The most vigorous effort has been made the past year to secure action on the part of the Freeholders, since the jail was not only a disgrace to our common civilization, but a menace to the health of the people. Its dark cells; its crowded corridors; its imperfect closets; its laundry work in the corridors; its defective light and air; the accumulation of decaying garbage; the filthy beds, and the dirty crowd of the most pitiable mass of humanity that can be imagined, all combined to present a picture over which the citizen might almost be led to despair. But it is joyful to be able to say that \$10,000 has been voted for the reconstruction or enlargement of the jail. While we think the building should have been abandoned, great improvements in its structure and condition can be made.

CAPE MAY COUNTY JAIL.

Cape May Court-House.

Visited April 19th, 1888. Sheriff, James Shoemaker. Keeper, Joseph S. Abrahams. Lives in house connected. Jail consists of two rooms, twenty by twenty-two, one above the other, and made secure by iron ceiling, &c. There are no cells. Last year the lower room was found very damp, and bad odors through the building. The keeper's family were all in ill health. The jail-room below was furred off from the wall, and the floor taken up. Thirteen dead cats found, besides other decayable matter. Several improvements were made, and at reasonable expense. Slop-water goes through pipe to a cesspool quite distant. An inside dry-closet is arranged so that the material can be collected outside, and so that any wetness is prevented. It is well secured and well ventilated, and, with one or two minor imperfections, answers well. No bath-tub; could be easily arranged for. Eight in all committed last year. Only one in jail now. No women committed last year. Justice can commit vagrants; but any special cases could be sent to alms-house. Jail is visited as often as necessary by those who look after moral instruction of inmates.

Although the jail could not be an example to larger counties, it now illustrates the advantage of good oversight, and probably has less inmates, because those committed there find it lonesome. Since the new arrangement of cesspool and outbuildings, the water has greatly improved, as well as the health of the jailor's family.

GLOUCESTER COUNTY JAIL.

Woodbury.

Visited April 24th, 1888. Sheriff, F. B. Ridgway. Physician, Dr. L. Redding. Location, high and good. Basement mostly above ground. Soil, sandy loam. Jail erected twelve years ago. Floors, concrete. Have no bedsteads. Do not furnish clothing or underclothing. Furnish towels. No bath-tub. Laundry work conducted in jail. Movable wash-tub. Turnkey provides hot water. Inmates are fed in the corridors. The sewage runs into a drain that drains the court-house and goes on to the creek, about 400 yards distant. Self-acting water-closets. Water-supply from iron tanks in attic. Might now have city water. Roof tin and painted. Ventilation by vent-pipe in cells to air flue. Furnaces for the jail and house. Seventy-nine names on list since April 24th, 1887. Two-thirds are justices' commitments. Four were women. Eight were under twenty-one; three under fifteen. Some are arrested drunk and let out next day. No longer take tramps; once had sixty-two one night. Allowance, fifteen cents for each meal. Only one death past year. Allowed daily papers, except in special cases. One person detained as witness the past year.

REMARKS.—This is one of the best jails in the State. The attention of the Sheriff was drawn to two or three minor improvements needed.

HUNTERDON COUNTY JAIL.

Flemington.

A report made formerly in reference to this institution drew attention to certain needed improvements, and suggestions were made as to how the conditions might be changed. These changes have been made to a certain extent. The jail consists of five compartments, with a hall-way, and in these there were, formerly, very poor closet arrange-

ments. These closets were removed, as we suggested, and a new one has been made in one of the larger compartments. Upon examining the closet at the end of a hall-way the following conditions were found: The closet was flushed directly from the water-pipe, about three inches above where the cock for the sink delivered it, and as it is customary in the jail to keep the water flowing into the closet all the time, whenever the water flowed into the sink, an up-current was drawn from the closet and mingled with the drinking-water. With the cock opened in the sink, a piece of lighted paper was drawn to the point of water-flush, under the closet seat. The suggestion was made that either the connection should be broken between the drinking-water supply and the closet, or an automatic flush tank should be attached. The jail, in other ways, was in good order. A boy thirteen years old was retained for stealing, and had been in the jail three months, which must necessarily, as a method of training, result disastrously in one so young.

MERCER COUNTY JAIL.

Trenton.

The Mercer county jail was visited April 9th, 1888. Located at Trenton, N. J. Chief Warden, John G. Muirheid. The jail has a few cells under the court-house, but nearly all in an extension. Court prisoners are kept as far as possible in the cells under the court-house. Prisoners sentenced by justices and police justices are known as short-term prisoners, since they cannot be sentenced for over ninety days. These make up about two-thirds of the sentences, and include, chiefly, drunkenness and vagrancy. The buildings are owned by the county. The area of grounds available to prisoners is about 200 feet square. The buildings are of stone and brick. Those in jail who are sentenced by the court may, after forty-eight hours, be transferred to the State Prison if so ordered. The jail was erected in 1836, but has since been extended. There are, in all, forty-two cells for males, of which ten are in the basement, which is two and a half feet below ground, and all the rest above ground. There are eight female cells, all above ground. Floors are concrete. Walls are whitewashed. All inside fixtures are connected with the sewers, instead of, as formerly, with an intervening cesspool. Could not get full particulars as to the character of the underground inside pipes, or as to the trap between inside

fixtures and sewers. No ventilating shaft to sewer system, but an intermediate pipe is claimed to ventilate near the curb outside. There are indoor water-closets in every cell. Those in the old jail are of the hopper style and self-flushing. Those in thirty-two newer cells are of the same shape, but do not work automatically, and are covered over on the seats with foul wood covers. There is one bath-tub, with hot and cold water, in the male department. Should be two—one in female department. The bath-tub in male department has back of it an illy-contrived receptacle for waste, which should be removed. There is no sanitary map of pipes and fixtures and drains. All slop-water goes from sinks into sewer. Disinfectants are used, but not with exact knowledge of their value. The water-supply is from the general supply, and is in every cell; supplied by gravity. The building is not wholly fire-proof. No fire-escape, as prisoners are kept on first floor. Depend on natural ventilation and on the corridors, which are roomy. Each cell has a small hole as a theoretical ventilator, but not effective. The heating is by steam. There is, at times, much overcrowding. In the old part the space of four cells is eight by four by twenty; height, eight and a half feet. Six others are six and a half by twelve; ceilings, eight feet. In newer part cells are six by eight. Generally two in a cell, and sometimes four. The average of inmates last six months, 100; highest number, 121. Now perfecting a plan by which the vagrant cases will have smaller cells for separate confinement, thus relieving the crowding and reducing the attractions of the jail as a social rendezvous. Believe this will, in the end, save as to numbers. Wood-sawing has proved unprofitable. The dietary is good and paid for by the county. Costs about fourteen cents apiece per day.

The female department is entirely separate, and well managed. Averages about twelve. A Matron employed, and much sewing done for the jail.

Clothes are furnished to prisoners when necessary. It is believed to be economical to encourage cleanliness by cheap clothing given to the inmates. No towels are provided; should be. Lighting is by gas.

In general, it can be said of this jail that it is gradually improving much in care and construction, and, with the exceptions named, is well arranged and disciplined. The Warden is very well informed as to what is needed, and there is increasing effort to make the jail what it should be. Soon after my visit the following letter was received:

“ WARDEN’S OFFICE, MERCER COUNTY, N. J. }
 “ JOHN G. MUIRHEID, WARDEN. }
 “ April 21st, 1888. }

“ *Dr. E. M. Hunt:*

MY DEAR SIR—Since your inspection of the Mercer county jail, the Court-House Committee, at your suggestion, has ordered and contracted for *cast-iron* covers for all the jail sinks.

“They also have had provided a liberal supply of towels for prisoners’ use.

“Mr. Coxon, the Director of the Board, informs me that the apparatus in the walls of the cells, the object of which you inquired about, are for the purpose of ventilation.

“Very respectfully yours,
 “JNO. G. MUIRHEID.”

MIDDLESEX COUNTY JAIL.

This jail is provided with two departments—a male and female—which are distinct and separate. The male department has ample accommodations, containing twenty single and double cells. These are all well whitewashed and were in excellent order. The cells are arranged on two floors, and the corridor is thoroughly lighted by a large skylight, which is available as a foul air outlet.

There were forty inmates confined. The female department contains eight cells, and all the closets were in good order. Over the female department there are the same number of cells, but this is kept for witnesses, except when the jail is overcrowded. As it is more modern than the other parts of the jail, it surpasses it in construction. The plumbing, heating apparatus, &c., are in good order.

The whole jail showed a regard, upon the part of those in charge, for the laws of cleanliness.

MONMOUTH COUNTY JAIL.

This institution is well arranged. It has a central tier of cells, all of which were in good condition. The female side is somewhat crowded. All the closet arrangements were in fair working order. The drain leading from the floor of the prison, which receives the wash of the floors, &c., crosses a roadway behind the jail, and as an open drain passes into the cesspool. This was very offensive, and the attention of the local Inspector was called to it. As the town has no

sewer system, the jail has to depend upon the cesspool, which has to be emptied very frequently. The only other point noticed was the discipline of the jail.

This can certainly be improved. The free-and-easy way in which the prisoners pass away their time, lying on the tables, playing cards, &c., the general look of comfort and happiness, certainly do not tend to produce any fear of the punishments which it is supposed that the law holds out to the law-breaker. Such may, in good part, be overcome, and by rigid discipline and good order, better habits and better morals would be less hopeless. These conditions exist, not only in this institution, but unfortunately in many, and attention is drawn to the fact, that better order and discipline may result.

OCEAN COUNTY JAIL.

Toms River.

This jail, until the past year, was in such condition as to render it unfit for use. Dr. Mitchell, as an Inspector of the Board, visited it, and, together with the attending physician and the Secretary, suggested the chief features of a plan for its improvement. These have been quite fully carried out. Another Inspector visited it September 4th, and reports as follows :

“The jail is quite well arranged. The cells are ample in number and size. The light and ventilation are good. The closets were not found in good working order. The attention of the health authorities was called to the fact, and attention will be given to remedying the evil. Insufficient water-supply is the chief cause of the trouble.”

ESTIMATE OF EXPENSES OF CHARITABLE AND PENAL INSTITUTIONS, AND NUMBER OF INMATES.

Independent of other considerations, we often fail to realize the great cost and increase of taxation which dependency and crime entail upon the State. The constructive expenses for asylums have been between five and six millions. That for prisons, penitentiaries, reform schools and jails not less than three millions, and for almshouses not far from one million. The yearly expenses of the various asylums are not less than six hundred thousand dollars. It is to be

remembered that these mostly represent the pauper element of society, or those who have become a public support. The sixth annual report of the Bureau of Labor places the yearly expense of crime, in 1882, at \$1,150,000. We now think it not less than \$1,500,000. The pauper system of the State costs not less than \$600,000.

These results are arrived at by an examination of the State finances and of the returns made each year from the counties, cities and townships to the Comptroller of the State. Some few townships each year fail of return, and so the results are approximate, but always less than the reality. Upon this calculation, beside all cost of construction, the annual yearly expense is somewhere between \$2,500,000 and \$3,000,000. This, too, be it remembered, is only the institutional record, and stands for a vast amount of suffering to families by reason of those incarcerated or by those thus dependent, and does not estimate the general unclassified charity by thousands and tens of thousands, which the generous sympathy of the people bestows upon families and individuals in their times of affliction and destitution. Is it not wise that the State, in the exercise of a common-sense political economy, and for the general welfare of its people, legislate and co-operate to prevent and remedy this the greatest disaster that befalls civilization and government? It is because of this that we plead in this behalf.

We append hereto a recent return of the various institutions of the State (not including township alms-houses), as giving some idea of the number now provided for :

CHARITABLE AND PENAL INSTITUTIONS OF NEW JERSEY.

Alms-Houses.

INSTITUTION	P. O. ADDRESS.	Total number of inmates.	Men.	Women.	Children—under fourteen.
Atlantic County.....	Smith's Landing.....	16	7	9	
Bergen County.....	Oradell.....	84	15	13	6
Tri-Township.....	Englewood.....	5	4	1	
Burlington County.....	Pemberton.....	288	130	82	26
Cumberland County.....	Bridgeton.....	78	46	20	2
Newark City.....	Newark.....	175	91	80	4
Orange City.....	Orange.....	20			
Gloucester County.....	Clarksboro.....	87	81	15	11
Trenton City.....	Trenton.....	68	44	24	
Hudson County.....	Snake Hill, Jersey City...	620	220	175	{ 148 males. 82 females.
New Brunswick City.....	New Brunswick.....	30	13	17	
Montmouth County.....		29			
Perth Amboy City.....	Perth Amboy.....	6	1	3	2
Morris County.....	Boonton.....	86	51	34	1
Paterson City.....	Paterson.....	191	69	83	40
Passaic City.....	Passaic.....	20			
Salem County.....	Woodstown.....	55	27	24	4
Sussex County.....	Branchville.....	85	27	38	20
Elizabeth City.....	Elizabeth.....	28	13	7	3
Warren County.....	Townsbury.....	83	47	33	3
		1,925			

Asylums.

INSTITUTION.	P. O. ADDRESS.	Total number of inmates.	Men.	Women.	Children—under fourteen.
State Asylum for the Insane.....	Morristown.....	904	462	441	1
New Jersey State Lunatic Asylum.....	Trenton.....	753	381	372	
Institution for Feeble-Minded } Women.....	Vineland.....	9			
New Jersey Home for the Educa- } tion and Care of Feeble-Minded } Children.....	Vineland.....	31	9	5	{ 11 males. 6 females.
Burlington County Insane Asylum.....	Pemberton.....	54	11	43	
Camden County Insane Asylum.....	Blackwood.....	118	50	68	
Cumberland County Insane Asylum.....	Bridgeton.....	12	5	7	
Essex County Asylum for Insane.....	Newark.....	413	164	249	1
Gloucester County Insane Asylum.....	Clarksboro.....	5	5		
Hudson County Lunatic Asylum.....	Snake Hill, Jersey City...	258	102	156	
Passaic County Insane Asylum.....	Paterson.....	49	17	32	
Salem County Insane Asylum.....	Woodstown.....	46	23	19	4
		2,552			

Penal Institutions.

INSTITUTION.	P. O. ADDRESS.	Total number of inmates.	Men.	Women.	Children—under fourteen.
New Jersey State Prison.....	Trenton	921	888	33	1
Atlantic County Jail.....	Mays Landing.....	8	7	.....	1
Bergen County Jail.....	Hackensack.....	21	20	.....	1
Burlington County Jail.....	Mount Holly.....	111	97	13	1
Camden County Jail.....	Camden	65	55	10	.....
Cape May County Jail.....	Cape May C. H.....	6	5	1	.....
Cumberland County Jail	Bridgeton.....	19	17	2	.....
Essex County Jail.....	Newark.....	184	150	32	2
Gloucester County Jail.....	Woodbury	8	8	.....	.....
Hudson County Jail.....	Jersey City.....	199	154	39	6
Hunterdon County Jail.....	Flemington.....	4	4	.....	.....
Mercer County Jail	Trenton.....	59	54	5	.....
Middlesex County Jail	New Brunswick.....	44	39	5	.....
Monmouth County Jail.....	Freehold	25	22	3	.....
Morris County Jail	Morristown.....	15	13	2	.....
Ocean County Jail.....	Toms River.....	2	2	.....	.....
Passaic County Jail.....	Paterson.....	72	55	10	.....
Salem County Jail.....	Salem	10	10	.....	.....
Somerset County Jail.....	Somerville.....	12	12	.....	.....
Sussex County Jail.....	Newton.....	2	2	.....	.....
Union County Jail.....	Elizabeth.....	50	41	9	.....
Warren County Jail.....	Belvidere.....	26	25	1	.....
State Reform School.. ..	Jamesburg.	185	.....	.....	185
Hudson County Penitentiary.....	Snake Hill, Jersey City...	223	193	29	1
Essex County Penitentiary.....	Caldwell.....	189	183	6	.....
†Newark City Home.....	Verona	175	.....	.....	{ *148 boys. *27 girls.
State Industrial School for Girls.....	Trenton.....	46	.....	.....	14
		2,631	.....	.....	.....

* From nine to eighteen years of age.
† The Newark City Home is for truant and wayward children, and is an auxiliary to the public school system of the city.

Recall that the alms-house list does not include outdoor relief from poor-fund or voluntary help of hospitals, orphan asylums and private charities, nor the seven township alms-houses of Essex county, Raritan township alms-house in Hunterdon county, three township alms-houses in Mercer county, two in Middlesex county, four in Somerset county, and the many townships that farm out the poor. We reckon the whole of alms-house relief at 2,600.

The State Board of Health uses a schedule of questions for its sanitary inquiries into institutions, a work which the State has committed to its care. It is glad to receive at any time information as to structural or administrative defects from managers, directors or skilled visitors, and will specially investigate when necessary. The other work of inquiry has reference to questions of correction and the best charitable care, and is nearly covered by details under such questions or headings as these :

1. Number of paupers examined.
2. Birthplaces.
3. Birth of parents.
4. Alien paupers.
5. Ages at the time of becoming inmates of alms-houses.
6. Ages at the time of the examination.
7. Length of time in alms-houses.
8. Other forms of relief furnished.
9. Education.
10. Habits.
11. Habits of parents, so far as ascertainable.
12. Habits of the insane.
13. Previous occupations.
14. Previous industrial habits.
15. Condition of ancestors and other near relatives.
16. Grouping of families in alms-houses.
17. Condition of the children of alms-house inmates.
18. Existing cause of dependence, such as—
 - a. Homeless children—illegitimate.
 - b. abandoned.
 - c. by death of father.
 - d. by death of mother.
 - e. by death of both parents.
 - f. by pauperism of parents.
 - g. by imprisonment of parents.
 - h. Homeless women—abandoned by husbands.
 - i. by death of husbands
 - j. Old and destitute.
 - k. Permanently diseased.
 - l. Temporarily diseased.
 - m. Crippled.
 - n. Deformed.
 - o. Blind.
 - p. Deaf-mutes.
 - q. Insane.
 - r. Idiots.
 - s. Epileptics.
 - t. Paralytics.
 - u. Feeble-minded.
 - v. Vagrant and idle.
19. Future of the inmates of alms-houses.
20. Report of what ought to be done with each individual.
21. Rules and regulations for alms-houses, &c.
22. General conclusions.

We thus commend this great interest of the care of the criminal and dependent classes to the early attention of this State, alike in their interests and for the common welfare of the whole people.

WATER-SUPPLY FROM WELLS, IN ITS RELATION TO HEALTH.

BY FRANCIS A. WILBER, M.S.,
Adjunct Professor of Analytical Chemistry, Rutgers College.

In considering this subject, let us notice :

1. The source of supply of well-water ; 2. Its collection ; 3. The sources of its impurities ; 4. Nature's means for removing such impurities, and the failure of these means ; 5. The relation between these impurities and public health.

The earth's surface is receiving, at frequent intervals, moisture from rainfall. A large portion of this fall is vaporized, and returned to the atmosphere directly, to be again condensed and re-precipitated as rain. A larger portion penetrates the porous soil, percolating through it, and seeking lower levels, striving to return to the water-courses or natural drains. This portion follows the more porous strata of the soil, and finds its way into all subterranean openings. As the numerous minute underground streams flow on, they unite, just as above ground, and form hidden water-courses, whose distance from the surface depends upon the stratification of the soil and rock. The water of these streams holds in solution all those soluble mineral and organic constituents of the soil with which it has come in contact for a time sufficiently long to dissolve them.

Into these covered streams are constantly percolating the drainage-waters from the soil directly above them. If this soil is porous, and the elevation considerable, the surface drainage penetrates long distances. If the porous stratum that carries the original stream passes under an impervious stratum of clay or rock, these surface additions may cease, and the stream flow on unaffected by the drainage from the soil above it.

The householder, needing water, sinks a shaft through the surface strata until he meets one of these underground streams or water-

saturated strata, and the water, finding in this shaft an underground reservoir, either flows rapidly or leaches more slowly in until a supply sufficient for his needs is collected. The shaft may be a deep one, passing through hundreds of feet of soil and rock, until it reaches the underground stream or reservoir. When this is reached, the head forces the water towards the surface, and we call the shaft an artesian well; or the excavation may be only a few feet in depth, when, the saturated layer being reached, the incoming water supplies the needs of the owner of the soil. This is the ordinary well in which hangs "the old oaken bucket."

I have hastily mentioned the source and method of collection of underground water in order to make more clear what I have to say regarding the use of well-waters in the country, or in more thickly-settled regions. I am well aware that these facts are very common ones and that they may be well known to all, but it is to be feared that all sanitary workers do not, at all times, bear them in mind when speaking or writing on questions of water-supply. The only source of supply is the water descending as rain, and the only way in which it reaches the place from which it is taken for the household use is this drainage through the soil.

The water in a well may receive impurities in several ways. The construction of the well may be faulty, so that surface drainage is allowed to flow into the well over its top, or, sinking into the surface soil, force its way through the wall. Or the situation of the well may be such that, while it is free from danger from the immediate vicinity, so far as surface drainage is concerned, it still receives the surface-water from sources of filth more remote. This drainage may flow in, in a practically unchanged condition, or it may be altered, as mentioned later.

The condition in which this filth reaches the well depends upon the distance that it flows to reach it, the time consumed in the flow and the character of the soil flowed through.

The average house-owner certainly believes that the water which he pumps clear and cool from his well is pure and wholesome. He does not stop to think of the impurities with which it may have come in contact during its flow from the surface to the bottom of his well. This well may be sunk in the immediate vicinity of an overflowing cesspool or out-house; the natural drainage of his own or his neighbor's barn-yard or pig-sty may be flowing over the soil, through which

is filtering the water that is to fill this underground cistern; or its bottom may be in a porous stratum of soil or gravel that receives, at a point higher than the bottom, the drainage from some grave-yard or other source of decaying organic matter; some neighboring tree may have thrust its rootlets through the wall of the well and there they remain to decay, or the top may not be tightly covered and stray toads or other vermin may tumble in to aid in the pollution of the supply, but our well-owner, not seeing, smelling or tasting the results of these additions to the underground reservoir, is not conscious of their existence. Nor is this indifference to the condition of the soil that serves as a filter for the household water-supply, or the surroundings of the well, confined to the ignorant man. Even the physician may, and in my experience not infrequently does, hold that impurities, mineral and organic, are removed from surface-water by the processes of natural filtration through the soil. If the soil was in a condition of virgin purity, and if the tax made on its filtering power was limited or only occasional, this might be the case. But such virgin condition of purity is not found in the natural filter-bed in thickly-settled or old localities. It is true that in passing through almost any soil-filter, turbid, filthy water loses its suspended matter and becomes clear. It is, therefore, commonly said to be filtered, the popular definition of filtration being the removal of such suspended matter. Filtration is this and much more. The water charged with organic and mineral salts and undecomposed organic matter in minute subdivision passes into the soil. If it has to flow any considerable distance the coarser suspended matter is held mechanically, as the water forces its way downward. At the same time the organic acids in solution act upon the oxides of iron and alumina in the soil, forming soluble compounds of these substances. These compounds, in turn, re-act upon the albuminous matter carried by the water, and coagulate it. The clots thus formed can no longer pass through the soil, from mechanical reasons, and they are consequently removed from the water. Together with these precipitated albuminous matters, and mechanically held by them, goes much of the suspended mineral matter, and a chemical purification of the water has been effected. This, in brief, is true filtration by nature's process.

Now, let the flow of organic impurities through this natural filter-bed be so great as to fill it with this precipitated organic matter. Decomposition of the masses of organic filth thus carried into the soil, takes place, and the soluble products of this decomposition flow

on with the underground streams until a well offers a collecting-place for them. Nor is this all. The soil, being taxed by the large amount of impurities sent through it beyond its filtering power, allows these soluble products to pass unchanged, and they are carried directly into the well, where the cessation of flow allows them to accumulate. Such a filth-saturated condition of the soil exists in every old and thickly-settled community. Here every stable, every out-house or cesspool, with their porous-walled (if walled at all) vaults, every kitchen drain and sewer, is furnishing its quota of organic impurities, all of which supply matter for decomposition.

The products of this decomposition are carried, as we have seen, directly to the wells, and they thus become suitable breeding-places for bacterial life—powder magazines—only needing the spark of a typhoid or other deadly germ to furnish the explosion of a scourge of disease. This filth-saturated condition of the soil is no flight of fancy, but solid fact, as every one who has watched the digging of a sewer or other excavation in a town, well knows. In a stiff, impervious soil the collection of organic filth is enormous, and the dangerous character of the organic matter in such soil when it is disturbed, is well known to every physician. Outbreaks of malarial disorders are almost certain to follow such disturbance. Nor are the conditions as to safety greater in a town built upon a sandy or porous soil. Here the organic impurities do not *collect* in such quantities in the soil, but to offset that, the flow from the surface to the water line of the well is more rapid. The well-owner, in this case, can drink, to-morrow, the kitchen slops or more nauseous wastes emptied yesterday upon the sand near his well. In districts underlaid by rocky strata, the danger does not disappear, as the seams in the rock, or faults in stratification, furnish convenient inlets for surface filth. This filth-polluted water, collected from either rocky strata, porous or compact soils, does not always (perhaps we might say does not usually) advertise its dangerous character. It is apt to be clear and cool, and is sought after for household use. There are no visible signs to show its condition, and the well-owner is usually prompt to resent as a personal grievance, any suggestion that the water is unfit for use. Striking instances of this could be given, but I will mention only one or two.

In New Brunswick, a well known to have been in use for more than 100 years, was located directly in the rear of a tenement-house and its surrounding out-houses. This house was used for many years

as a tavern, the slops from the kitchen being discharged in the immediate vicinity. Near by was an old stable-yard and stables, the surface drainage from both being directly towards the well. The soil in the entire vicinity was completely saturated with organic impurities, and although the supply that fed the well did not come from surface or local drainage, it was supplemented by both. The water from this well was clear, cold and agreeable to the taste, and was much sought after for drinking purposes. Chemical and bacteriological tests showed it to be the merest sewage, and yet when the facts were stated, many persons using the well were greatly offended at the *attack* upon the character of this water.

Another case was that of a well situated in a depression in the red shale that had become filled with sand. The water was used by numerous families, and during the summer there was scarcely ever a time when some one in this vicinity was not suffering from low fevers or bowel troubles. The quality of the water was shown, and the well closed by the Board of Health, and great was the cry at the *injustice* inflicted upon this locality.

The popular indifference to the condition of the soil surrounding the household water-supply is very great.

Men who would not for an instant allow the presence of filth in connection with the bread or meat put upon their tables, will not give a moment's thought to the state of the filter-bed through which passes the water daily used by their families. Worse than that, they will deliberately make large additions of household filth to the surface of this filter-bed.

It is not my province to set forth the full effects of the use of water thus filth-saturated, upon the public health. The condition of the soil in country, village and town is, in many cases, such that such water, only, can be obtained from the wells sunk in it. The physician can tell you that, while water containing organic impurities may not be a direct producer of disease, it still can work its evil by inducing a gradual lowering of the tone of the system. Persons using such water are less able to withstand the assaults of prevailing diseases. This is particularly the case when this water is used by small children and aged and infirm persons. I firmly believe that a large proportion of the deaths of infants, during the heated term of our summers, is directly induced by the use of just such water, and in many cases coming under my own observation this belief has been directly confirmed.

Add, now, to the direct results of the use of filthy well-waters the indirect danger that they furnish in providing breeding-places for disease germs, and the most convenient means for distributing such germs and introducing them into the systems of those using them, and you have an indictment sufficiently strong to insure conviction unless the grounds taken here can be disproved.

Health authorities, everywhere, recognize, to some extent, the dangers to public health arising from the use of well-waters in towns and cities. The labors of such officers would be greatly lessened if it were possible to convince the communities using wells as sources of household water-supply, of the dangers to which they are being subjected. Ignorance lies at the bottom of public indifference to this and similar sanitary matters, and only persistent and wise pressure on the part of those interested in sanitary progress will lead to a removal of this ignorance.

The study of hygiene in the public schools will prepare the public mind for more intelligent thinking on such subjects, and judicious agitation can be made to do its part in this important work.

There are but few towns in our State in which water-supply from wells is at all admissible. In one or two instances, the geological structure underlying a town renders a present use of wells possible. In these cases, a stiff clay, impervious to water, overlies the gravel strata that carries the water. This gravel formation outcrops and receives its drainage-water, entirely outside the town, in a hilly, scantily-settled region. The water flowing underneath the town is, therefore, not polluted by surface drainage, and is fit for use. It will continue to be fit until there are a sufficient number of avenues for the passage of surface-water through the clay made to allow it to become polluted.

In concluding this brief sketch of the dangers to public health arising from the use of water obtained from wells in towns and cities, let me call attention to the great value of pure water as a remedial agent. We know very little of its effects, as the use of water containing mineral or organic constituents, or both, in considerable quantities, is almost universal. Absolutely pure water is one of the greatest luxuries of modern life, and nothing, in our modern civilization, marks more strongly, public enlightenment in matters of health, than does the interest now being taken in the subject of water-supply for towns and cities.

ICE AS A SOURCE OF DISEASE.

BY WM. K. NEWTON, M.D., PATERSON, N. J.

Prior to the publication of an article in the seventh report of the State Board of Health of Massachusetts, on an outbreak of intestinal disorders, attributable to the contamination of drinking-water by means of impure ice, it was almost universally held that ice was not a source of disease. This supposition was based on the facts that water undergoes a change during the process of freezing, and that ice is ordinarily purer than the water from which it is produced. It is also known that many substances are excluded from the water when freezing, as is illustrated in the case of frozen sea-water, which contains less of the salines than the original water. But it has been proven that ice sometimes contains a relatively larger proportion of organic matter than the water from which it is made. Another fact should be noted ; that is, that large pieces of organic matter are entrapped in the ice, and are preserved for the time from putrefactive changes, which changes, however, are set up or renewed when the ice melts. Hence, as the ice is formed from the surface-water, all floating particles, or the matter on the surface, in polluted streams or ponds, are caught in the ice and preserved until the ice melts. After appreciating these fundamental facts, let us turn to the evidence in the case and see what may be done to obviate the danger.

The first recorded case, as mentioned above, where disease was traced to polluted ice, is that of an epidemic of intestinal troubles occurring at Rye Beach, in 1875. There broke out at that time among the inmates of a large hotel, a number of cases of bowel disorders, characterized by giddiness, nausea, vomiting and diarrhœa. After eliminating all other possible causes of the trouble, it was ascertained that the ice, which was taken from an adjacent pond, was the sole cause of the outbreak. This pond contained large quantities of putrescent matter, composed of marsh-mud and decomposing saw-dust. The

water of the pond was discolored, and, when agitated, emitted a very offensive odor; the mud at the bottom, when disturbed, gave off large volumes of foul gas. It will be seen from the above statement that the pollution in this case was not of animal origin, but that the condition of the pond, and the rotting saw-dust therein, were the causes of the disease.

Kedzie, of Michigan, who also investigated this subject, ascertained that ice taken from streams and ponds containing rotten saw-dust was a cause of diarrhoea.

A similar investigation was made into the character of ice sold at Newport, R. I., which was cut from ponds in the immediate neighborhood of the city, and contained an excessive proportion of organic matter.

Chamberlain, in the fifth Connecticut report, records a fatal case of typhoid fever due to the use of ice from a pond into which the dejecta of another patient, sick with that disease, had been thrown.

The instances mentioned might be considerably increased, but sufficient has been stated to forcibly indicate the dangers to health from this cause.

From the above-mentioned cases, we may deduce the following: Organic matter, instead of being eliminated from ice during the process of freezing, is retained therein. This fact must not be forgotten, for aside from the presence of actual disease germs in ice, the presence of a putrescible material is of itself a source of danger. Hence, ice taken from streams near the outlets of sewers must of necessity contain large amounts of foul material.

Of greater interest to us is an answer to the question, Are disease germs killed by the freezing process? In answer to this, we may quote the following evidence:

Pengra, of Michigan, in State Board of Health report for 1884, showed that bacteria, infusoria and other organisms were found in ice, and that their vitality was not injured by freezing.

Cohn ascertained that a temperature of zero F. was not fatal to certain species of bacteria.

Frisch found that a temperature of -80° F. failed to destroy the vitality of both micrococci and bacilli.

Prudden, in 1887, made an extended series of experiments on the influence of freezing upon the vitality of bacteria. According to his observations, certain bacteria resist protracted freezing, while others

fail to grow when they have been subjected to a freezing temperature for a certain time. The bacillus prodigiosus was destroyed by being frozen for fifty-one days. A bacillus in Hudson river ice survived a low temperature for seventy-seven days. The bacillus of typhoid fever survived after 103 days; repeated freezing and thawing, however, were fatal to the latter.

The effect of high temperatures on the various germs has been very thoroughly studied, and the results of these experiments are satisfactory; the effects of low temperatures, on the other hand, are not so well known. But from the above-mentioned experiments it may be stated that low temperatures are not always fatal to organisms of the lower orders; the effect of freezing being only a paralyzing one for the time being.

We may sum up as follows: The use of ice cut from streams, ponds or lakes polluted by sewage or organic refuse of any kind, is dangerous to health.

This being the case, it is the duty of sanitarians to educate the people to an appreciation of the fact and to urge on the Legislature and Health Boards the necessity of checking the sale of polluted ice.

Laws on this subject have been passed in the States of Massachusetts, New Hampshire and New Jersey.

In Massachusetts no horse can be driven on a field of ice that is to be used for domestic purposes. Upon complaint from twenty-five consumers that ice is impure, the State Board of Health must investigate.

In this State a law passed in 1882 provides a penalty for the punishment of persons who willfully pollute ice-ponds. In 1885 a law was passed that contains the following provisions: No ice shall be cut, for purposes of sale, in any city, from any pond, creek or river within the limits of said city, unless permission so to do shall first have been obtained from the Local Board of Health of said city. No ice may be sold in any city without a permit so to do from the Local Board of Health. Such permit may be refused if the ice is from an impure source. Boards of Health in cities may prohibit the sale if from an impure source.

If the provisions of this law were extended to boroughs and other municipalities, and then strictly enforced, all dangers from this source would be removed.

THE WATER-SUPPLIES OF NEW JERSEY.

BY A. CLARK HUNT, M.D., SANITARY INSPECTOR.

It has long been apparent that every advance in methods for protecting the health of the people must include a full knowledge of the water-supply used for drinking purposes. There has not only been of late years great advance as to methods for testing the conditions of various waters, but also our knowledge of the relation of impure water to disease has been largely increased. While it is admitted that drinking or potable water may contain many organic materials which do not cause declared disease, and that much depends on the character of these materials and the state they are in, yet the direction of all our facts is to show that in such case undue and unnecessary demand is made on the vital forces. We have *standards* of pure water, and it is in the interests of mankind, and of animals, too, that pure water be sought and used. With impure water, although persons, and even communities, may for a long time escape palpable evidence of injury, it is never known when the danger line will be reached. A drought or a freshet, a certain number of unusually hot and humid days, or the arrival in town of some specific form of fever, may at once permit the condition of the water to determine the outbreak of pestilence or the great spread of some form of diarrheal disease. We should not take such risks.

But not only has the advance of science certified the differences between pure and impure water. The observations and the clinical experience of physicians fully confirm the view that water, and that impure water especially, is the carrier, perhaps the originator, of specific diseases. It determines their activity and is the chief vehicle for their spread. This does not mean that all impure waters produce disease in all persons. Besides the kind and degree and condition of the contamination, the condition of the *individual* is a factor. The susceptibility of one and the vital resistance of another are often alike inexplicable. But our text-books and our experiences are such that no physician with a wife and a family of children desires to pro-

vide them with water abounding in putrescent organic matter, or with such exuberance of low and decaying plant life or of micro-organisms as is never found in good water. Hence, whatever may be the captiousness of individuals, the chief authorities in chemistry, biology and the care of the public health, as well as the people, are in accord that our water-supplies should furnish good water.

While this, as a rule, is to be had from deep wells, it is only so because (a) they have good percolating surroundings, and (b) can be protected from surface contaminations. Both of these requisites cease to be true when human habitations are so crowded and so mingled with factories, stables, out-houses and all the necessary off-fallings of life, that the ground ceases to be a good percolator and has to receive debris and contamination on every side. Hence it is that in every close city the time comes when the well which was good for the family in the lone house is not good when twenty families and a hundred people live within a hundred feet of it. So the public or city water-supply becomes a necessity.

We have so many cities in this State, and so many villages that are coming to be cities, that no question relating to the public health is more important. Facts which came more fully in our possession last year, in inquiries into the interests of the immense population now depending on the Passaic as a water-supply, as also facts as to Camden, and as to various smaller cities, led this Board to direct an inquiry into the water-supplies of the State.

This inquiry was not meant to include, at present, a thorough investigation into the quality of supplies, such as would involve weekly or monthly chemical and other examinations, but to acquaint us with certain preliminary facts, as also to inform us as to how far the water was affected by modes of storage. Also, as to the present acceptability of the supply, and as to how far the people living in cities having a public water-supply, had substituted it for wells. A. Clark Hunt, M.D., as a Health Inspector, was put in more special charge of the inquiry.

As a guide, and yet not as including all the information desired, the following schedule of questions was used :

" STATE OF NEW JERSEY,
" STATE BOARD OF HEALTH.

" Please fill out such portions of this blank as are applicable to your water-supply, and forward to office of the State Board of Health, Trenton, N. J.

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"Some of the blanks have been partly filled from information now in the possession of the Board: please correct if wrong.

DATE. ———— 18 .

- "1. Name of city or town.
- "2. Population, 18 .
- "3. Date when works were built, and by whom designed. If not all built at one time, state what additions were made, and when. (See Plans.)
- "4. By whom are works owned?
- "5. Source or sources of water-supply.
- "6. Area of water-shed supplying such source or sources.
- "7. General geological and topographical character of the water-shed.
- "8. Mode of supply, whether by gravity or pumping, and whether distributing reservoir, stand-pipe or tank is used.
- "9. General description of storage and distributing reservoirs—natural or artificial, how constructed, area of water surface, capacity, character of bottom, amount of shallow flowage, &c.—times of cleansing.
- "10. Does all water pumped go through the distributing reservoir or tank?
- "11. What portion of the water pumped goes into the distributing reservoir?
- "12. Whether or not the water is delivered into the distributing reservoir at one side and drawn out at the other.
- "13. Number, kind, size and depth of wells used as sources of water-supply.
- "14. Miles of mains, sizes, taps.
- "15. Number of hydrants.
- "16. Ordinary pressure.
- "17. Fire pressure.
- "18. Meters.
- "19. Describe filter-galleries or basins, and connections, if any, with stream, pond or reservoir.
- "20. Average daily capacity of works in dry year.
- "21. Daily average consumption.
- "22. Number of houses using the water.
- "23. Is water supplied to any one outside of your town or city?
- "24. Material of distributing mains.
- "25. Material of service-pipes.
- "26. Does the water-supply receive sewage, drainage from factories (mentioning kind), or other pollutions?
- "27. If there have been any bad tastes in the water, or excess of vegetable growth, or if the fish have been generally affected, and such occurrences are not fully described in printed reports, please describe the same and the remedy adopted, if any. Send each year, printed report to this Board.
- "28. Have analyses of water from the present source been made? By whom? When? If not given in printed reports, please furnish copy of same.

"29. Have records of the temperature of the water been taken in the past? If not printed, will you furnish copies if blanks are sent?

"30. If you keep records of the temperature of water, please furnish.

"31. Do you take samples of water for analysis each month, for information and comparison?

"32. To whom shall future correspondence be addressed?

"33. Name of person furnishing this information."

We believe it best to give the facts just as they have been elicited. While in all material respects correct, yet it has sometimes been found difficult to secure all details. This has arisen in most cases from a want of knowledge of all the facts by those in charge or the absence of the particular person who was presumed to know. Where an engineer has been in charge there has been no embarrassment, but some of the water companies have no engineer really in charge. Sometimes there has been indisposition to state the number of houses supplied.

While many very satisfactory water-supplies have been found, the facts elicited chiefly point to need of attention in the following directions:

I. Too often the original choice of supply has not been competently made. It has generally been made by those of good intent and of ability in the lines of their particular callings, but without familiarity with rainfall, water-sheds, population, apparatus and all the varied information that should be in possession of some one guiding the source of supply and the plant by which it is to be introduced, stored and distributed.

II. While many of the companies supplying cities have been of great service, two classes of cases prove embarrassing—those in which most respected and wealthy persons are stockholders, receiving good dividends and seeming to become very conservative as to the quality of the supply, and, second, those cases in which outside parties have formed a corporation for speculative purposes and are not particular enough in all the details of healthy and effective service. While in some cases, no doubt, it is better for cities to depend upon responsible and energetic companies, generally a city should own its water-supply.

III. Even where the quality and quantity of supply is satisfactory, there is too often neglect as to reservoirs, pipes, connection in houses and modes of distribution.

IV. Where the water is for a time objectionable there is not enough thorough investigation of causes. For instance, we have known a

water-supply to deteriorate for weeks and yet call forth no investigation from a company, even though it is known that, in other cases, covering of reservoirs, the introduction of oxygen or clarification by alum under expert direction, have in a very short time removed the evil.

V. Even where the water-supply is good it is often lamentable how little it is used, the people still clinging to the old well after it has come to represent the drainage of the neighborhood. Just at this writing two samples from two wells in two cities show much contamination.

Under the four first-named heads we might have given some flagrant examples in the State that have come under the direct knowledge of the Secretary and of the Sanitary Inspectors, but prefer at present to draw attention to the supplies in general. Our thanks are due to individuals in charge for much valuable information.

In connection with the visits and investigations made, many suggestions have been given, and we have already found that the local water-supplies were being examined with more technical care. We believe that this inquiry is of great value to the localities and that it will aid not only to guide them, but also to assist others, in their plans for the future. It is known to us that not only many cities, but some of the towns of less size, feel themselves forced to meet this question, and it is of the utmost importance that no mistakes be made in the start. The introduction of a good water-supply under expert direction and with such financial care as to secure it at a reasonable expense, is always an excellent investment for a city, but the introduction of a poor or inadequate supply in an imperfect way is an experiment disastrous to all public improvement.

No State in the Union has a better supply of salt water and fresh—none that has so available a supply of good drinking-water—for its population, taken as a whole. We still believe that the State should secure to itself its abundant resources, as so often presented by the Board of State Water Commissioners, the State Geologist and by this Board. We hope, at least, somehow, there will in the near future be a great improvement in the supplies to some of our cities, and that those now seeking a supply for the first time will not repeat errors perchance excusable thirty years ago, but by no means excusable now.

The following are the places whose water-supplies have been examined, embracing, we believe, all places that have perfected a supply :

CITIES HAVING PUBLIC WATER-SUPPLIES.

Asbury Park.	Long Branch.
Atlantic City.	Lakewood.
Bayonne.	Merchantville.
Belvidere.	Millville.
Beverly.	Morristown.
Bordentown.	Moorestown.
Bound Brook.	Mount Holly.
Burlington.	Montclair.
Bloomfield. (See East Orange.)	Newark.
Bridgeton.	New Brunswick.
Camden.	Orange.
Cape May..	Ocean Grove.
Dover.	Passaic.
East Orange.	Paterson.
Elizabeth.	Pennington.
*Englewood.	Perth Amboy.
Flemington.	Princeton.
Gloucester.	Rahway.
*Hackensack.	Red Bank.
Haddonfield.	Salem.
Hackettstown.	Somerville.
*Hoboken.	Trenton.
*Harrison. (See Jersey City.)	Washington.
Jersey City.	Wenonah.
Kearny. (See Jersey City.)	Woodbury.
Lambertville.	

The following are the questions on water-supply which were used as guides in the inquiry :

Name of city or town.
Population.
Number houses.
Date when works built.
By whom designed.
Additions, &c.
By whom owned.
Source or sources of supply.
Area of water-shed.
Geographical and topographical characteristics.
Mode of supply—gravity or pump.
Is there distributing reservoir?

*Supplied by Hackensack Water Company.

General description of reservoir—natural or artificial, how constructed, area of surface, capacity.

Does all water pass through reservoir, or do you at times pump direct?

What proportion goes through the reservoir?

Where does water enter the reservoir?

From what part is it drawn?

How often cleaned.

Number, size and depths of wells used as sources of supply.

Miles of mains. Sizes.

Are there many dead ends?

Number of taps.

Number of hydrants.

Number of houses using the supply.

Ordinary pressure.

Fire pressure.

Is supply by meters or by schedule?

Describe filters.

Average daily capacity.

Daily consumption.

Is it supplied to any one outside of your town?

Material of distributing mains.

Material of service-pipes?

Does water-supply receive sewage, drainage from factories or other pollution?

Describe foreign tastes, smell or vegetable growths, if fish affected, and if any of these, what remedy is used.

Has analysis been made? When? By whom?

If printed, in what report?

Name of person giving the information.

The following are the notes as to localities, furnished by the Inspector after examination :

ASBURY PARK.

Asbury Park has a population of 2,124. This, of course, does not include the summer floating population. There are 502 houses. The water-works were started in 1886 and completed in 1888; designed by Mr. Isaac Carson. The plant is owned by the city. The water is obtained from artesian wells, located near the head of the lake and along the railroad. The deepest well is 560 feet; the most shallow one, 425 feet. There are, in all, 20 wells, varying in size from 3 to 6 inches in diameter. Only 17 of these are in use. The wells yield from 4 to 40 gallons per minute. The water is

pumped from the head of Fletcher lake to the stand-pipe, which is situated on Second avenue, near the railroad. This stand-pipe is 125 feet high and 12 feet in diameter, and has a capacity of 100,000 gallons. There is also an auxiliary pumping-station in the stand-pipe lot. There are between 10 and 11 miles of pipes, running in size from 2 inches to 3 inches in diameter. There are 524 taps and 60 double-nozzle hydrants. The pressure under the stand-pipe is 60 pounds; ordinary pressure is from 30 to 40 pounds. The daily capacity is not determined, but is sufficient for present needs. The wells do not yield as much as the pumps require. The consumption in summer is 750,000 gallons per day. The system of pipe is almost a complete loop system.

Several analyses have been made by Profs. Cook and Chandler, and also by Dr. Christine, all of which were satisfactory. The water is pure, sparkling, but somewhat hard.

ATLANTIC CITY.

Atlantic City has a population of 7,942. This is increased in summer to 30,000. The number of houses is 1,725. The works were erected in 1880; they are owned by the Wood company. The source of supply is from the mainland; it was first the overflow from a mill-race, but now the company own the mill-pond. It is difficult to estimate the water-shed, as the land is sea-made. The pond not yielding a sufficient quantity, driven wells were put down around it, from which the supply is now obtained. The water is pumped to a stand-pipe. The consumption in summer is 50,000 gallons, some days. There are 10 or more miles of pipes. The pressure is from 40 to 60 pounds. The capacity is not estimated. The charges are regulated by meters and schedule. The number of houses supplied is 1,207; of these 281 are hotels and boarding-houses. The water is regarded as good, but no recent examinations have been made.

Two years ago the "Consumers' Water Co." was formed. They have sunk one driven well 1,100 feet and obtained a copious supply of water, which is free from organic matter, but which, when warm, has a taste of sulphur. The well is about 1,200 feet from the ocean; it was completed three months ago. The temperature at first was 64°. It flowed 175 gallons per minute, and rose from 10 to 15 feet. It is now being pumped, and is nearly ready for introduction. Surface wells are fast disappearing from Atlantic City.

BAYONNE.

Bayonne has a population of 13,080. There are 1,779 dwellings in the city. Bayonne includes Bergen Point and Centreville and Sallersville. The source of supply is same as that of Jersey City, namely, the Passaic river above Belleville. Water is received from a reservoir in Jersey City, located between Central and Summit avenues. The pressure is 45 pounds. Pipes are of cast iron. They extend over 9 miles. The mains are 20 inches in diameter; and six-inch pipe is the smallest used for distribution. There are 72 hydrants; and 1,000 dwelling-houses are supplied. The capacity is very great. The consumption is not reckoned, as it is not separated from the Jersey City supply. There are numerous complaints as to taste and discoloration, and at times the water is very unpleasant for drinking purposes.

BELVIDERE.

Belvidere has a population of 1,814. There are 394 dwellings in the town. The water-supply was introduced in 1879. The source of supply is the Delaware river. The water is pumped to a stand-pipe 16 feet in diameter, and 160 feet in height. The supply is owned by a private company. There are 3 miles of pipes. The main is 10 inches in diameter. The distributing pipes run from 8 inches to 4 inches in diameter. There are 34,000 gallons stored. The pressure is 70 pounds. The average consumption is 50,000 gallons per day; 160 houses use the supply. A test of the water, taken directly from the hydrants, is very satisfactory. The water is apparently very pure and wholesome.

BEVERLY.

Beverly has a population of 1,973. There are 425 houses. The water-works were completed 1887. They were designed by the Gloucester Iron Works. There have been no additions. The plant is owned by the Beverly Water Company. The source of supply is the Delaware river. The water is pumped directly to a stand-pipe, which has a diameter of 12 feet and is 100 feet in height. The capacity is 90,000 gallons.

The water can be pumped direct, in case of fire. There are 6 miles of pipes. There are 160 taps and 44 hydrants. The number of

houses using the water is about the same as the number of taps. The pressure is from 30 to 47 pounds. Water is supplied upon a schedule of prices. The water is filtered at the intake. The average consumption is 30,000 gallons per day. The main is twelve-inch and distributing-pipes run from ten-inch to four-inch. The material is cast iron, tested at 300 pounds. Edgewater, Beverly township, receives the same supply. Water has thus far been very satisfactory. There is no printed analysis of the water.

BOUND BROOK.

The supply is not yet completed. It is controlled by the Bound Brook Water Company. Mr. Sylvanus Ayers, Jr., is the engineer and manager. The source of supply is the east and west branches of Middle Brook, which secures a water-shed of about 70,000 acres. The dams which are prepared are $2\frac{3}{4}$ miles from the lower part of town, and the source of the streams is from 6 to 8 miles distant. The first dam on the east branch will be 71 feet long and an average of 15 feet solid masonry, and will hold 1,250,000 gallons. The second will be built about 300 feet above the first, and will be about 300 feet long and an average of 10 feet in depth, and will give storage of 11,000,000 gallons. The first dam is 110 feet above the lowest level of the town and the second is 13 feet higher. The yield has not been estimated. The amount that can be supplied will be at least 250,000 gallons per day. The pressure will be between 40 and 50 pounds. The main will be 10 inches in diameter and of cast iron. The analysis is very satisfactory. The supply is expected to be one of great merit.

BORDENTOWN.

Bordentown has a population of 4,683. There are 1,211 dwellings in the city. The supply is owned by the Bordentown Reservoir and Water Company, and was introduced in 1853. The supply represents springs and a water-shed in the pine district. The capacity has not been calculated. The water is taken from Crosswicks creek. The water is pumped to a reservoir, which is situated 1 mile back of the town, near the cemetery. The capacity of the reservoir is 500,000 gallons. The pressure is from 30 to 40 pounds. The water

can be pumped direct in case of fires. The well at the pumping station is 18 feet deeper than the bottom of the creek. This is cleaned out every year, and from 1 to 2 wagon-loads of mud removed. The presence of this mud is about the only serious matter with which the company has to contend. There are 6 miles of pipe, running from 6 to 4 inches in diameter. Chemical analysis of the water is said to be satisfactory. I did not obtain it. The daily consumption amounts to 100,000 gallons. There are 300 consumers. The water is soft and pleasant. The wells in the city are very shallow, and the water in them is contaminated by surface soakage. This fact seems to force the necessity of using the public supply. The adoption of some good filter will probably improve the present supply to a great extent.

BLOOMFIELD.

Bloomfield has a population of 6,702. There are 1,033 houses. Two hundred and fifty of these are now supplied with water, and the number is steadily increasing. For further particulars as to source, &c., see East Orange supply.

BRIDGETON.

Bridgeton has a population of 10,065. There are 2,093 dwelling-houses in the city. The water-supply was introduced in 1878, and is owned by the city. The supply is taken from a mill-pond, which is fed by a stream which arises in the cedar swamps. This stream is about 5 miles long. The pond is situated within the city limits, and has a storage capacity of 90,000,000 gallons. The water is pumped to a reservoir 1 mile from the city; this has a capacity of 1,500,000 gallons. In addition to the pond supply, during the past year a well was dug for the purpose of improving the quality of the water; this well is situated below the dam, and is 30 feet in diameter by 20 feet in depth; the digging was through pure, white sand; this well lowered the water in the stream, flowing from the retaining reservoir. The retaining reservoir is situated below the dam, and holds 2,000,000 gallons. The temperature of the water in the well is from 53° to 56°; that of the surface-water in the pond last year, reached as high as 90°. During a certain period last year, the water had a bad taste and smell;

the main source of supposed contamination has been from a canning factory which is at the head of the pond, on the borders of a swamp through which the feed-stream runs; for years this swamp has been used for the deposit of the refuse from the factory, and the ground has become saturated; analyses made by Messrs. Austen and Wilber, show conclusively that the contamination was from this source, as the water above was exceptionally pure; greater care is exercised by the factory at present, but the ground should be improved by digging out and filling with good gravel. The well yields 500,000 gallons per day. The daily consumption is 247,000 gallons. There are 1,100 taps, and about the same number of houses are supplied.

There are 16 miles of pipe. The mains are 11 inches in diameter, and the distributing-pipes are some of them 3 inches in diameter. The house connections are of galvanized iron. The water from the pond is soft, and that from the well, hard. The well is covered and ventilated. The pressure is 30 to 50 pounds. The reservoir has been cleaned once in six years, and only three-fourths of an inch of sediment obtained. The well is quite shallow, and has shown, already, a slight tendency to taste. The dangers of contamination are the swamp and the fact that the natural drainage of some of the streets flows into the pond; if these are carefully watched, there is no reason why the supply should not be pure.

BURLINGTON.

Burlington has a population of 6,553. There are 1,385 houses in the city. The water-supply was formerly owned by a company. Works were built in 1804. The city purchased the plant in 1877. The whole arrangement, buildings, &c., were changed, as the old pipes were too small, and the service was very imperfect in many ways. The water is taken from the Delaware river and is pumped to two wrought-iron tanks. These, combined, hold 90,000 gallons. The pressure is 20 pounds. The capacity is 2,000,000 gallons per day. The average daily consumption is 350,000 gallons. There are 1,600 taps. There are no meters. There are 9 miles of pipe, running from 24 inches in diameter to 4 inches. House connections are of lead. The water has no bad taste. No analyses are recorded. The supply is pronounced satisfactory.

CAMDEN.

Camden has a population of 52,884. There are 10,522 houses in the city. The water-supply is owned by the city. The water was introduced in 1870; prior to this, from 1845, it belonged to a chartered company. The water is taken from the Delaware, at Pavonia, and is pumped to a stand-pipe, and from thence to a reservoir. The stand-pipe is 5 feet in diameter and 127 feet in height. There is an additional stand-pipe, which is 10 feet in diameter by 88 feet in height. The reservoir is square, with a five-foot bridge-wall. Its dimensions are 224 feet at the top, by 344 feet. The water can be pumped direct, if necessary. The mains are 30 inches in diameter, and the distributing-pipes run down to 4 inches in diameter. Pipes are of cast iron. There are, in all, 52 miles of pipe. The capacity is practically unlimited; 5,000,000 gallons are pumped per day. Analyses have been made from time to time. Most of the houses are supplied. The pressure is from 40 to 50 pounds. The city uses both meter and schedule. It is very hard to ascertain the number of houses connected, as the old company had no regulation as to way of tapping, &c. The water, by analysis, is said to be pure and good, but as it is taken from the river there is great risk of contamination. The supply should certainly be examined very frequently and carefully. We believe the committee of council has done wisely in advising a new source of supply.

CAPE MAY CITY.

Population in winter, 1,610, census of 1885. Houses, 246. The city was among the first to have a driven well as a public water-supply. The first well was an artesian, 6 inches diameter, 96 feet deep, with a good supply. The water was of a yellowish color, an iron taste, and unfit for drinking purposes. The well was put in about 1874, and abandoned in 1885. The next was a surface-well, near the school-house. Then followed the one near Madison avenue. The Madison avenue works are used still in the summer season about two or three weeks, then only about three hours daily, so as to give the large well a rest. This is scarcely necessary. After this last well was dug, the supply was insufficient. Then a series of six-inch wells were sunk 50 feet, and they proved a failure on account of fine sand, the supply

being only about 100 gallons per minute. Then the large well, 30 feet in depth, was made, which is one of the best investments the city ever made. This is about one mile from the city.

The water stands in the well seven feet from the surface, except when heavily pumped. It is distributed from tanks holding 60,000 gallons each, into which it is pumped by a Worthington pump. These tanks are cleansed each spring. The water is softer than in the city. It is distributed to houses and through the city in the usual way. Most of the houses and hotels take it, but I could not ascertain the exact number. Some private wells are still used.

DOVER.

Dover has a population of 3,170. There are 527 houses in the town. The water-supply has been recently introduced; the plant was finished November, 1887, and was accepted by the town, March, 1888. The supply is owned by the Dover Water Company. The engineer was Mr. Isaac S. Carson. The water is taken from springs, which are about 1 mile from the city; there are 16 springs, each of which is walled up, and covered with a cast-iron door. Terra-cotta pipes, 10, 8, 6 and 4 inches in diameter, lead from these springs to the reservoir. The reservoir is in a cup-shaped depression, and the pipes lead from it, $2\frac{1}{2}$ miles around the hill, to the town, as gravity is the only force needed. The reservoir is 170 feet above the level at the corner of Sussex and Blackwell streets. It is constructed of stone and earth-work, and is divided into two divisions for cleaning purposes. Its dimensions are as follows: 190 feet 6 inches by 221 feet at the top of each compartment, and 154 feet 6 inches by 185 feet at the bottom; the average depth is 12 feet. Its capacity is 6,000,000 gallons. The water is taken from the reservoir at three depths, namely, at the bottom, and also 6 and 10 feet up. The main is 10 inches in diameter, and the distributing-pipes run from 8 to 4 inches in diameter. The pipes are 5 feet below the surface. The pressure is about 80 lbs. There are $6\frac{36}{100}$ miles of pipe. All connection is made under the supervision of the company. The temperature of the water is from 45° to 48° . There are 50 hydrants and 5 houses connected. Analysis of the water is satisfactory in every way. The supply is one of exceptional purity, and no doubt will soon be extensively taken.

ELIZABETH.

Elizabeth has a population of 32,119. There are 4,960 houses in the city. The supply for this city is taken from the Elizabeth river, which has its origin in springs, and represents 9 miles of water-shed. The brook is dammed at a point three-fifths of a mile from the Pennsylvania railroad depot. The reservoir is a large one, having a capacity of 4,000,000 gallons. From this the water is carried by a pipe-line running along the river to the pumping station, which is near the Central railroad. The water reaches the station by gravity. At times there has been trouble with the water from turbidity, especially after heavy storms. To avoid this, a second reservoir was constructed 100 yards below the original one. While the water is clear No. 2 is allowed to fill, and thus, after storms, No. 2 becomes available. After the water in No. 1 has settled, the supply is again taken from it. In reservoir No. 2 there is a large charcoal filter, containing 5,000 cubic feet of charcoal, with which the water has at least three minutes' contact. This is to serve the double purpose of retaining the organic matter and that oxidation may take place. The filter does, to some extent, purify the water, yet it is difficult to ascertain how far it accomplishes it. The pipes are of cast iron, running from 16 inches in diameter to 4 inches. Over 2,000 houses are supplied. All connections are under the supervision of the company. The reservoirs are regularly cleaned. No. 1 being so arranged that by flood-gates the bottom can be cleansed, and also the amount flowing over the dam limited. Mr. Battin planned the works, and Mr. L. B. Battin is at present the Superintendent. The water has at times had taste, and also been quite roily, but frequent analyses reveal no dangerous qualities. Upon the whole, the supply is a good one.

EAST ORANGE.

East Orange has a population of 10,328. There are 1,605 houses. The works were commenced in 1882. The supply is owned by the East Orange Water Company. The water is obtained from 3 deep and 3 dug wells. The 3 deep wells are 90 feet in depth. The dug wells go to the rock-bed, then from 6 to 12 feet into the rock, and are then walled up. The wells are situated in a basin from which

the water flows into Sunset pond and thence to the Passaic river. Nos. 1, 2 and 3 are the deep wells. Nos. 4, 5 and 6 are the dug wells. No. 4 yields 500,000 gallons in 24 hours. No. 5, 900,000 gallons. No. 6, 900,000 gallons. The dug wells are 50 feet in depth, and 26, 52 and 100 feet in diameter. The water is pumped from the wells simultaneously. The water in the wells stands from 4 to 5 feet higher than the water in the valley. The temperature of the water is 52 degrees. The estimated storage in the wells is over 2,000,000 gallons. The pressure varies from 50 to 70 pounds. There are 1,200 houses supplied in East Orange. The pipes vary from 12 to 4 inches in diameter. The supply is estimated to be sufficient for a city of 40,000 inhabitants. Analyses have been made, and the water is exceptionally pure and wholesome. The company also supply Bloomfield with water.

FLEMINGTON.

Flemington has a population of 1,909. There are 386 dwellings. The water-supply was introduced in 1859. It is owned by the Flemington Water Company. The source of supply was originally from springs exclusively; now, in addition, the South Branch is used, and also the well at the copper mine. The water is pumped direct to two reservoirs situated on Mullen hill, 70 feet above the town. These are made of brick; one is square and the other circular. Their combined capacity is 600,000 gallons. The water from the springs flows by gravity to the circular reservoir, and the water is pumped from the branch; there are 5 miles of pipe, running from 6 to 3 inches in diameter. The material is wrought iron. The water is filtered at the intake. One hundred and thirty-seven houses are connected with the supply. There are 9 hydrants. The consumption is 40,000 gallons per day. The water from the well in times of drought has a slight taste and is quite hard.

GLoucester CITY.

Gloucester City has a population of 5,966. The number of houses is 1,137. The water-works were erected in 1883. There have been no additions. The supply was obtained from springs, which did not give a sufficient quantity, and it became necessary to use the Newton

creek as the principal dependence. This receives the tide-water from the Delaware river. The water is pumped to a stand-pipe, which is 75 feet in height and 18 feet in diameter. Its capacity is 145,000 gallons. They can pump direct for fire purposes. There are from 9 to 10 miles of pipe, running from 16 to 4 inches in diameter. There are 467 taps and 66 hydrants. The ordinary pressure is 45 pounds. There are no meters used. The capacity is only limited by the capacity of the pumps. At least 1,000 houses use the water. Pipes are made of cast iron. Service-pipes are of lead and galvanized iron. Analysis made last year was satisfactory and was printed at the time.

HACKENSACK WATER COMPANY, RE-ORGANIZED.

This company supplies all that portion of northern New Jersey lying north of Jersey City and between the Hackensack and Hudson rivers, northerly to the village of New Milford, on the Hackensack river, about five miles north of Hackensack. This district includes the city of Hoboken and the following towns and townships: West Hoboken, Weehawken, Union, Guttenberg, North Bergen, Fairview, Ridgefield, Hackensack, and Englewood, &c.

The total population supplied is about 75,000. About 6,000 houses are connected with the mains.

The works were designed by John F. Ward, C.E., and Chas. B. Brush, C.E. The additions were designed by Chas. B. Brush, C.E.

The works are owned by the Hackensack Water Company, Re-organized. The plant in Hoboken is owned by the city.

The source of supply is the Hackensack river at the village of New Milford. The area of the water-shed is about 100 square miles.

About half the water-shed is a rolling country with generally sandy soil. The balance, consisting of the lower range of the Highlands, is rocky, mountainous and precipitous. There are no large settlements of consequence within this drainage area, and the situation and surroundings are such as not to be favorable for suburban settlements or manufacturing industries.

There are two distributing reservoirs and three distributing tanks, all artificial. The water passes through all of these reservoirs and tanks for the different districts they supply, but all are arranged with by-passes, so the water may be pumped direct. All of the water is pumped.

The main reservoir is at Weehawken. Its capacity is 15,000,000 gallons; depth of water, 16 feet. The area of the water surface is 143,000 square feet. There is a reservoir at Hackensack of the capacity of 3,000,000 gallons, and a water surface of 34,000 square feet; depth of water, 13 feet. The tank in the high-service tower is covered. It has a capacity of 150,000 gallons, with a water surface of 700 square feet; depth of water, 30 feet. The tank for the Englewood distribution is practically a regulator to relieve the water-hammer on the pipes. It has a capacity of 5,000 gallons, and a water surface of 78 square feet; depth of water, 10 feet. The tank is covered. The tank for regulating supply to Shadyside is also covered. It has a capacity of about 2,000 gallons, and a water surface of 25 square feet; depth of water, 10 feet. In all these tanks and reservoirs the water enters on one side and passes out on the other side.

In each case the water is drawn from the bottom only, except in the case of the large reservoir, in which case it is drawn from the bottom and also from a point about two-thirds the depth of the water from the bottom. They are all thoroughly cleaned each year. No wells are used as a source of supply. There are about 75 miles of mains through which the water passes. There are about 5,750 taps and 450 fire hydrants on these mains.

The pressure varies in different parts of the district. The ordinary pressure is about 40 pounds and the fire pressure about 60 pounds.

About half the service-pipes are metered. All new consumers are metered in all districts, and all consumers are metered except some original consumers in Hoboken and Hackensack. There are no filters, but the water is aerated both at the pumping station at New Milford and the reservoir at Weehawken. The capacity of the plant will be, within a month or two, about 10,000,000 gallons per day, and the daily consumption is about 4,500,000 gallons per day. The mains are of cast iron and the service-pipes are of lead.

The water-supply does not receive sewage, drainage from factories, or other pollution. A few years ago there was trouble at certain seasons of the year, due to an excess of vegetation, commonly known as algæ. Since aëration of the water was introduced, there has been no further difficulty. Carp and black bass are carefully cultivated in the reservoirs, and they materially assist in keeping the water pure and sweet.

Analyses are made monthly of the water at different points by Prof. Albert R. Leeds, of the Stevens Institute, in Hoboken.

HACKETTSTOWN.

Hackettstown has a population of 2,645. There are 479 houses in the borough. The water-supply is obtained from several sources, located at different points, but all having origin in springs. One is situated in Morris county, 1 mile from the town, where a dam forms a reservoir, from which water flows by gravity through a ten-inch pipe to the town. There is at this reservoir a stone and charcoal filter, which has a beneficial effect. There are 10 miles of pipe, some of which are as small as 2 inches in diameter. This reservoir was cleaned in 1880. The yield from this is about 300,000 gallons. There are 2 other ponds known as Kings and Parks ponds, each using filter as in the other, and being upon the same principle. The former supplies the railroad company, and the latter supplies North Hackettstown. The town owns both of them. The water has no bad taste or smell, except occasionally, from the collection of leaves or from neglect of the ponds. The supply seems to give satisfaction.

HADDONFIELD.

Haddonfield has a population of 1,950. There are 402 houses. The works were erected in 1887. The supply is owned by the Haddonfield Water Company. Water is obtained from springs in a ravine $1\frac{1}{2}$ miles from the town. The water is stored in a pond with a capacity of 2,000,000 gallons. From this it is pumped to a stand-pipe, which is 110 feet high and has a diameter of 15 feet. The capacity of the stand-pipe is 145,000 gallons. There are $3\frac{1}{2}$ miles of iron pipe, running from 6 inches in diameter to 3 inches. There are 100 taps, which represent about the same number of houses supplied. There are a few meters used, and for others there is a regular schedule of prices. The pressure is from 40 to 50 pounds. The pumping capacity is 700,000 gallons per day. The supply does not equal this at present, but when necessity requires, it can be increased. The average daily consumption is 20,000 gallons. An analysis which has been made of the water is satisfactory. The water which

comes down the stream after showers, and has a tendency to roil the water in the basin, is, by a recent arrangement, made to flow around the basin and away. Thus the supply is kept much clearer than formerly. The number of those applying for connection is constantly increasing.

JERSEY CITY.

Jersey City has a population 153,312. There are 16,114 dwellings in the city. The water-works were built in 1854; Mr. John Ward was the engineer. The works are owned by the city. The source of supply is the Passaic river, and the water is taken from the river at a point near Belleville. The water is pumped from this point to a reservoir which has a capacity of 63,000,000 gallons. A portion of the supply is pumped direct; two-thirds of the supply passes through the reservoir. The water enters the reservoir at the top and is drawn from the bottom. It has only been necessary to clean the reservoir once in fifteen years.

The number of feet of pipe of the different sizes is as follows: Three-inch, 6,108; four-inch, 31,492; eight-inch, 45,604; ten-inch, 16,859; twelve-inch, 45,037; sixteen-inch, 27,071; twenty-inch, 66,232; twenty-four-inch, 12,214; twenty-six-inch, 3,500; thirty-six-inch, 39,971. The pipes are of cast iron and cement. There are, necessarily, many dead ends. There are 16,936 taps and 1,490 hydrants. The pressure is from 15 to 50 pounds. The water is supplied on a system of meters and by schedule. There are no filters. The capacity is 22,000,000 gallons. The average consumption is 17,000,000 gallons per day. Analyses of the water are made monthly by Messrs. Austen and Wilber, but these are not printed. The water has, at times, been severely criticised, and the question of its potability is under discussion. The introduction of some new supply is contemplated. The sources of pollution are the factories and cities along the Passaic, above the intake. The city supplies water to Bayonne, Harrison and Kearny.

LAKEWOOD.

Lakewood has a population of 1,000; this varies much with the season of the year. The number of houses is not estimated. The

works were built in 1886. They were designed by Mr. Herring. The Lakewood Water Company are the owners. The source of supply is the Metedeconk river. The soil is sandy. The water is pumped direct, into a stand-pipe, which is 20 feet in diameter and 64 feet in height. There are two and three-quarter miles of pipe. The pipes are of cast iron, ranging in size from 8 to 4 inches. There are 35 taps and 10 hydrants. The ordinary pressure is 45 pounds. The water is supplied upon a schedule and by contract. There is a brass filter at the intake. The capacity is 1,000,000 gallons. The consumption varies from 70,000 to 100,000 gallons. The company own two miles up the stream for protection. Analysis which has been made of the water is on file. The system is an entire loop system throughout. The water has some color, but as it is used almost entirely for other purposes than drinking, this has no deleterious effect.

LAMBERTVILLE.

Lambertville has a population of 4,067. There are 969 houses in the city. The water-supply was owned by a company, under an old charter. Introduced under present control in 1877. The water is taken from Swan creek, at a point $1\frac{1}{2}$ miles from the city. There are two reservoirs. No. 1 has a capacity of 6,975,000 gallons. No. 2 has a capacity of 17,000,000 gallons. The water flows by gravity to the city. The pressure is from 40 to 60 pounds. The main is 8 inches in diameter. The laterals are from 6 to 4 inches in diameter. Lead pipe is used for close connections. All connections are made under the supervision of the company. The dead ends are flushed every day in summer. The reservoirs are cleaned whenever necessary. The hydrants are placed one-fourth of a mile apart. There are 220 houses using the supply. There is at times in certain seasons a slight taste and odor. This has been carefully examined by the company, and a report by Mr. Cochran tends to show that it is almost entirely due to stagnation and lack of aëration, and he suggests as a remedy the aëration of the water and the use of a filter which shall cause precipitation by the use of alum. The water is systematically examined, and, with the exception of a few days in each year, is very satisfactory.

LONG BRANCH.

Long Branch has a population of 5,140. This does not include the large summer population. There are 1,015 houses in the city. The water-supply is owned and controlled by the Long Branch Water Company. It was introduced in 1887. The source of supply is the Cranbury or Whalepond creek. The reservoirs are two in number. Five thousand cubic yards of earth were taken from them. The bottom is covered with gravel and broken stone. The capacity of these is 1,500,000 gallons. The water flows from 7 miles of country above the works, through yellow sand. There are peat and iron deposits at the source. These only produce an effect after storms or during freshets. The flow of the stream is estimated to be 5,000,000 gallons. The water is pumped to a stand-pipe at West End, which is 18 feet in diameter and 75 in height, with a base 10 feet high. The stand-pipe is 110 feet above tide-water. The capacity of the stand-pipe is 143,000 gallons. The water is filtered through a stone filter before entering the reservoir. There are 25 miles of pipe, running from 20 inches in diameter to 4 inches. Seven hundred houses are connected with the supply. There are no meters used. The largest consumption recorded was July 14th, 1887, when 1,822,000 gallons were used. The smallest consumption was February 12th, 1887, when only 99,000 gallons were used. The pressure in Long Branch is 37 pounds. The pipe system has but few dead ends, and in summer the watering-carts take from these, and thus keep the water from stagnating. The water was examined by Prof. Leeds and pronounced satisfactory, with the exception of the taste and discoloration. To overcome these difficulties and make the water agreeable as well as wholesome, during the past summer eight large Hyatt filters have been introduced, having a daily capacity of 2,000,000 gallons. These have proved very satisfactory, and a decided change for the better has taken place. It is also proposed to introduce some method of aëration. The company supply the following places: Long Branch, West End, Elberon, Monmouth Beach, Seabright and Highland Beach.

MERCHANTVILLE.

Merchantville has a population of 741. There are 131 houses in the town. The water-works are owned by a private company. The

supply was introduced in February, 1887. The water is taken from springs on a side hill, near the west branch of the Pensauken creek. This is about 2 miles from the town. There are 13 springs flowing into the receiving basin. This basin is 120 feet in length by 60 in breadth, and has a depth of 14 feet. The water is pumped from this point to a stand-pipe situated in the public square. The stand-pipe is 8 feet in diameter, and 100 feet high. It has a capacity of 40,000 gallons. The pressure is 43 pounds. There are 27 hydrants and 159 taps, representing 200 houses. There are 8 miles of cast-iron pipe, running from 8 to 4 inches in diameter.

The winter consumption per day is 20,000 gallons. The summer consumption per day is 126,000 gallons. The supply can be increased by using the spring-run adjacent to the receiving basin; and an examination of this in a dry season shows that 400,000 gallons per day can be added to the present supply; also, if necessary, the creek may become available, as chemical examination shows the water in it to be good for all purposes. In fact, all available waters near the present supply have been examined with reference to future needs. Analysis of the present supply is very satisfactory. At times, in summer, there is a slight taste from vegetable matter, but this is infrequent and of short duration. The water is soft and pleasant, and gives apparent satisfaction.

MONTCLAIR.

Montclair has a population of 6,327. There are 986 houses in the township. The procuring of an adequate and satisfactory water-supply has been under consideration for a long time, and in 1886 the work began, and has nearly reached completion. The plant belongs to a syndicate called the Montclair Water Company. The source of supply is a well located 325 feet north of Watchung avenue, and about 600 feet west of the valley road. The company owns three and three-quarters acres. The well is 2,400 feet from the top of the mountain; it is 1,600 feet from Harrison spring, which has a yield of 100,000 gallons per day. The pumping station is 315 feet above tide-water. The well does not affect the spring, but the water-level in the wells north of the city is lowered. The engineer is Mr. Chas. Brush. The capacity of the well is 500,000 gallons. At first a test well, 4 inches in diameter, was sunk; water was found at a depth of 56 feet, and it rose to within one foot of the surface; a pump was

attached to this well, and 149,000 gallons pumped from it in 48 hours, and the water was lowered in the pipe 11 feet; 23 minutes after the pumping stopped, the water returned to within 18 inches of the surface; this being satisfactory, the permanent well has been dug 30 feet in diameter and 51 feet in depth; at this point its yielding power began to diminish, and 5 five-inch drills were made to an average depth of 45 feet; from these the water flowed so rapidly that it was necessary to plug the opening; it is now estimated that 250,000 gallons are flowing daily. There is to be, for the present, but one well. The pipes extend over 22 miles, and run from 12 inches in diameter to 4 inches. The greatest care has been used in the selection of all materials. The well is to be covered and ventilated. There are 2,000 applicants for the supply. The temperature of the water is 50°. The water is pumped to a reservoir 638 feet above tide-water. There is an iron tank; it has a capacity of 500,000 gallons. Chemical examination of the water is very satisfactory. The ground around the well has a bed of clay, varying in depth from 6 to 12 feet, and as the well is walled above the ground surface, this acts as an impermeable layer, so that the well can receive no surface-water. The work has all been carefully planned and carried to completion, and the supply should certainly prove satisfactory.

MOORESTOWN.

The works are being finished this year—1888. The supply is owned by a private company. The water is obtained from springs a little over a mile southwest of the town. There was formerly at this point a pond. This has been dredged out. It has a sand bottom. It has a capacity of 2,000,000 gallons. The water is pumped to a tank on the easterly end of Main street. This is placed on a tower 45 feet high and 24 feet across. The tank is made of cedar, and is 22 feet in diameter and 25 feet high. Its capacity is 75,000 gallons. The water can be pumped direct for fire purposes. The pressure is from 50 to 60 pounds. There are from 6 to 7 miles of pipe, made of alternate layers of iron and cement. The sizes used are from 10 to 4 inches. The pipes are tested at 600 pounds pressure. The system is arranged so that there will be few dead ends.

An analysis which has been made is satisfactory. There have been already 70 applications, and there will be 50 hydrants supplying water to the city.

MILLVILLE.

Millville has a population of 8,824. There are in the city 1,804 dwellings. The water-supply was introduced in 1879. The supply is owned by the Millville Water Company. The water is taken from the Maurice river, and also from a dug well 15 feet in diameter and 16 feet in depth. The water is pumped to a stand-pipe 12 feet in diameter and 128 in height. The water is pumped by a steam-pump, and a turbine wheel is also used. The stand-pipe is located at the head of Columbia avenue. The consumption is 500,000 gallons per day. The people of the city depend to a large extent upon dug wells for their drinking-water. Not over 10 per cent. of the houses avail themselves of the public supply. The pipes are of cast iron, running from 12 to 4 inches in diameter. The system is well looped. The pressure is from 45 to 55 pounds. The company make the taps and carry the pipes to the curb. Some meters are used. There are no known pollutions of the supply. There is, at times, during the summer, a slight taste to the water. The noticeable feature in this supply is the fact that so few take it. Although the well-water is said to be exceptionally good, nevertheless there is danger that in the future, with the rapid growth of the city and no provision for the sewage, there may occur a general contamination of the wells.

MOUNT HOLLY.

Mount Holly has a population of 5,006. There are 1,101 houses in the township. The charter for the water company is dated 1845. The water is taken from the north branch of the Rancocas creek. A dam separates the water-supply from the tide-water. The water is pumped from the basin to a reservoir situated on Mount Holly; this is 100 by 50 feet, by 15 feet in depth. It is divided into two basins. Its capacity is 600,000 gallons. The water enters the bottom, and is taken from a point 2 feet higher. There are 4 filters at the intake. The consumption is 191,626 gallons per day; 475 houses use the water. There are 29 hydrants. The pressure is from 35 to 40 pounds. There are 8 miles of pipe, running from 6 to 3 inches in diameter. The water has a color from the cedar swamps, and the taste usually found in such water. There was a contamination of the supply at

Smithville, which has been stopped. The only objectionable feature at present is the tendency to a deposit of fine mud at the intake. This can, and probably will, be overcome in the future. The company is now arranging to change the point of intake.

MORRISTOWN.

Morristown has a population of 8,760. The number of houses is 1,308. The charter for the company dates back to 1800; John Doughty and associates held the original charter; additions and changes have been made from time to time, and also changes in ownership; it now belongs to 12 individuals. The supply is spring-water from three different sources, located within $1\frac{1}{2}$ miles of the public square—one is on the Mendham road, one on the Jockey Hollow road, and the third on the Baskingridge road. The soil in this section is gravelly. The water is supplied by gravity, except from the sand spring on the Baskingridge road, which is pumped to the mains running from the other springs. There are two collecting reservoirs on the Mendham road, and one on the Jockey Hollow road. The distributing reservoir is situated in the town; the estimated capacity is 650,000 barrels. The pipes run from 10 inches in diameter to 3 inches; they are made of cast iron. There are 700 taps. There are 61 hydrants and cisterns. The pressure varies with locality, from 40 to 60 pounds. The water is supplied to consumers both on a schedule and by meters. Seven hundred and fifty-six houses use the water. Capacity is 75,000 gallons per day. The service-pipes are of lead and galvanized iron. There has been, at times, a fishy taste, but an analysis made by Profs. Leeds and Chandler shows that this was due to vegetable matter in the reservoir, and the analysis also revealed the fact that the water was a pure spring-water, exceptionally free from impurities.

NEWARK.

Newark has a population of 152,988. There are 19,467 dwelling-houses. The supply is taken from the Passaic river near Belleville. The present works were erected from 1867 to 1869. Prior to this the water was taken from springs, from 1860 to 1869, and also partly from the Morris canal. The original charter dates back to 1800. The water is pumped to 3 reservoirs. The Belleville reservoir has an elevation of 165 feet, and is 400 by 280 feet. Its capacity is

14,000,000 gallons. The low-service reservoir is in the city. Its elevation is 114 feet. It is circular, and 450 feet in diameter. Its capacity is 21,000,000 gallons. This reservoir is only filled to an elevation of 107 feet, with a capacity of 14,000,000 gallons. The high-service reservoir is also in the city. Its elevation is 223 feet. It is 300 feet by 25, and its capacity is 9,000,000 gallons. There are 160 $\frac{1}{2}$ miles of pipe, running from 3 to 30 inches. There are 1,341 hydrants. The highest average monthly consumption in 1887 was 14,295,582. The lowest average monthly consumption in 1887 was 10,884,097. The pressure at Belleville level is from 20 to 33 pounds. The pressure at low service is 20 to 37 pounds. The pressure at high service is 30 to 80 pounds. The pressure at special high service is 30 to 50 pounds. Belleville is supplied from the same source. The question of the quality of the Newark water-supply has been and still is under discussion. (See article in last report.)

NEW BRUNSWICK.

New Brunswick has a population of 18,258. There are 2,732 houses. The works were constructed in 1868. Since 1873 they have been owned by the city. Before that date a company had control. The water is taken from Weston's pond, which receives its supply from Lawrence brook. The area of the water-shed represented is 40 square miles. The water is pumped to a reservoir, which is constructed in the form of a square, 300 feet each way, at the top, and 240 feet at the bottom. There are 2 basins, each of the size mentioned. The bottom is puddled. The capacity is 14,000,000 gallons. There are 25 miles of pipe, some of which are of cast iron, others of wrought iron and cement. The main is 16 inches in diameter. There are 1,813 permits issued. There are 176 hydrants. The average pressure is 35 pounds. Prices are determined by meters and by schedule. Limit of pumping capacity is 3,000,000 gallons per day. The average consumption is 1,083,000 gallons per day. Seventeen hundred houses are connected with the water-supply. The pipes run from 12 to 4 inches in diameter. The Milltown factories are on the line of the stream, and Parsons' snuff mills. At certain times in summer, after there has been drought, followed by rains, the water has a bad taste and smell. Analyses have been made, and are on record. The reservoir is regularly cleaned each year, and care is used to prevent any stagnation of water at dead ends.

OCEAN GROVE.

Ocean Grove has a population of 1,177; this is changed in summer by an increase to 30,000. The number of houses is 293. The water-works were constructed in 1882, under the supervision of Mr. H. C. Safford. The water-supply is owned by the Association. The water is obtained from artesian wells; there are in all, 14 wells, 2 of which have been abandoned; the wells are 4 inches in diameter; the average depth of the wells is 425 feet. The water is pumped to a stand-pipe; this is placed on a structure which is 5 feet in height. The reservoir itself is 30 feet in height and 35 feet in diameter. The intention is, at present, to raise the whole structure 25 or 30 feet; this reservoir is merely for storage and pressure; it is situated at the end of the loop system farthest from the pumping station, and what is not used during the day is stored, and returns to the pipes when the pumping is stopped. There are 10 miles of pipe. There are 534 taps, and 40 hydrants. The pressure is 40 pounds. There are some meters in use. The capacity is 550 gallons per minute. The daily summer consumption is 300,000 gallons. West Grove is also supplied from same source. Prof. Cook has made an analysis, which is in print. The water is pure, soft and sparkling, and gives general satisfaction.

ORANGE.

Orange has a population of 15,231. There are 2,177 houses. Works were constructed in 1882. They were designed by Mr. W. B. Rider. There have been no additions. They are owned by the city. The source of supply is the west branch of the Rahway river. The area of the water-shed is 5 square miles. The water is supplied by gravity. A reservoir has been made by building a dam across the valley. One hundred and sixty-five hundredths acres are used for reservoir purposes. The reservoir will hold 273,955,654 gallons. There is a gate in the middle of the dam, and an overflow at one end. There are 35 miles of pipe. The main is 20 inches in diameter. There are 1,027 taps. The price of the water is regulated by meters and by schedule. The capacity is unlimited. The consumption is not estimated. There are 1,200 consumers. One-third of the population are estimated as using the supply. It is supplied to a few private individuals outside. The supply is only polluted by surface

drainage. In summer and in certain sections, water standing in mains and at dead ends becomes bad, by reason of the decomposition of vegetable matter. It has both a bad taste and smell. But the water, as it enters the main, is always palatable, showing that stagnation is the principal cause of the trouble. The system has also many dead ends, which tend to increase this. Analyses have been made, but they are not in print.

PASSAIC.

Passaic has a population of 8,326. There are 1,087 houses in the city. The water-supply is controlled by a private company. The water was introduced in 1862. The source was formerly the Passaic river. It has now been changed to Vreeland lake, which is fed by springs. This change was made April 30th, 1888. The water is pumped to a reservoir located 1 mile southwest of the pumping station. Its size is 75 by 125 feet. It is oval, and has a puddled bottom. Its capacity is 700,000 gallons. The water is taken from the reservoir at two points on opposite sides. The pipes are of cement, and some of iron. They run from 4 to 12 inches in diameter. They extend over between 11 and 12 miles. There are 103 hydrants, and 375 houses are supplied. The average consumption is 500,000 gallons. Analyses have been made from time to time. The water, in summer, shows the effect of vegetation. With this exception, which only occurs infrequently, the water is satisfactory.

PATERSON.

Paterson has a population of 63,273. There are 8,386 houses in the city. The water-supply was introduced in 1856. The source of supply is the Passaic river. The water is pumped to four reservoirs—No. 1 has a capacity of 25,000,000 gallons; No. 2, 12,000,000 gallons; No. 3, 8,000,000 gallons; No. 4, 3,000,000 gallons. These reservoirs are situated near the river. There is a thorough circulation of the water in them. There are 5,250 houses supplied with the water. There are 681 fire-hydrants. The pipes are of cast iron, lined with cement, and they extend over 70 miles. They vary in size from 36 to 4 inches in diameter. The pressure is from 35 to 45 pounds. Analyses have been satisfactory. At times, the water is roily and has a taste due to vegetable matter.

PENNINGTON.

The supply was introduced in 1887. The source of supply is from a spring 2 miles away, situated on the Golden property. The reservoir is 80 feet in diameter, and has a crib in the middle, 16 by 20 by 20. The supply-pipe enters at a depth of 10 feet above the bottom of the crib. The soil is a clay loam and coarse, broken earth. The pipe is 4 inches in diameter. There are $2\frac{1}{2}$ miles of pipe. Forty-two families and the Pennington Seminary use the water. The water flows by gravity, and the pressure is 20 pounds. A spring 150 feet above the one mentioned, flows into the reservoir. The supply belongs to a private company. The consumption in summer, averages 2,800 gallons per day. The water is soft, and the analysis is in every way satisfactory.

PERTH AMBOY.

Perth Amboy has a population of 6,311. The number of houses is 921. The water-works were completed in 1883. Mr. George Inman was the engineer. The supply is owned by a private company. The supply is derived from the Englewood brook, which is dammed to secure pondage. The supply represents surface and ground-water only. The pond holds 160,000,000 gallons. The water is pumped from the pond to a stand-pipe, which is 71 feet 10 inches in height, and is 20 feet in diameter; it has a capacity of 176,000 gallons. The water secured represents $2\frac{1}{2}$ miles of water-shed. The water is never allowed to get lower than 5 days' consumption, but to do this, it is necessary, at times, to limit consumption. There are 7 miles of pipe, which vary in size from 12 to 4 inches in diameter. The pipes have an average depth of $3\frac{1}{2}$ feet. The average pressure is 42 pounds. The daily pumpage is 350,000 gallons. There are 150 house connections. The water was examined when introduced, and was then said to be a good water for domestic use. The water is often roily, and has an unpleasant taste. The supply is inadequate, and not of the best. In all probability, some new supply will have to be obtained in the near future.

PHILLIPSBURG.

Phillipsburg has a population of 8,058. There are 1,690 houses. The water-works were commenced in 1886, and finished in 1887.

The supply is obtained from a well near the Delaware river. The supply is owned by a private company. The plant is 1 mile above the town. The well is 49 feet deep; this is connected with another well by a twenty-inch pipe, and the second well is arranged so that, if necessary, the water can be let in from the river, but thus far the well has given an abundant supply. The water is pumped to a reservoir with a capacity of 2,000,000 gallons. There are 6 or 7 miles of cast-iron pipe, varying in size from 14 to 4 inches in diameter. There are 300 houses supplied, and 65 hydrants. The water, by analysis, is pure, but quite hard. Those who do not take the public supply, depend upon cisterns. There is but one well in use in the town. The reason for this lies in the fact that the city is located on a bluff, and it is almost impossible to obtain water from wells.

PRINCETON.

Princeton has a population of 4,577; this is increased by the number of students in the College and Seminary. There are 883 houses in the township. The works were completed in 1883, and are controlled by a private company. The water is obtained from a natural filter-bed, $1\frac{1}{2}$ miles from the borough, and on the north side of Stony brook, in the bottom-lands. The water is taken from a well 25 feet in diameter, with the masonry carried above the freshet level; this well can receive no contamination from above, as the surface of the ground surrounding it is covered with an impermeable layer of clay. The water is pumped through a ten-inch main to a stand-pipe 150 feet high, and 250 feet above the source. It has a capacity of 142,000 gallons. The lateral pipes are 6 and 4 inches in diameter. There are 212 houses supplied, in addition to the college buildings. The yield is estimated at 90,000,000 gallons. The pressure is from 50 to 80 pounds. The consumption is from 40,000 to 50,000 gallons per day. Analyses are satisfactory. The water is moderately hard. The residents are rapidly availing themselves of the supply.

RAHWAY.

Rahway has a population of 6,861. There are 1,345 houses in the city. The works were built in 1871, and are owned by the city. The water is taken from the Rahway river. The water flows from

the river into a well, and thence is pumped directly into the mains. The tide-water does not set back as far as the works. The works are located at Bechler's hill. The water is filtered at the intake. The pipes are cement-lined, and vary in size from 12 to 4 inches in diameter. The whole system is flushed twice a year. Six hundred houses and factories are supplied. There are 123 hydrants. The average consumption is 721,000 gallons per day. There has been trouble in the past during freshets and drought by reason of the discoloration and bad taste. This is difficult to overcome, as the stream is quite shallow and receives large surface drainage. An analysis made three years ago revealed no detrimental qualities.

RED BANK.

Red Bank has a population of 3,186. The number of houses is 573. The water-works were completed in 1884. The water-supply is obtained from a dug well 62 feet deep and 20 feet in diameter. Six eight-inch pipes were driven 10 feet below the bottom of this well, as it was found that the large well could be sunk no deeper without danger. Since the first well, there have been 12 driven wells put down near the original well, varying in depth from 80 to 150 feet. The reservoir is situated on Borden's hill. It is oval in form. It has a capacity of 60,000 gallons. The system is looped as much as possible. There are from 3 to 4 miles of cast pipe, running from 10 to 4 inches. There are but few dead ends. The number of houses supplied is 150. The number of hydrants is 70. The pressure varies from 40 to 50 pounds. Pump daily, 100,000 gallons. The capacity of large well is 250,000 gallons per day. The estimated capacity of all wells combined is 600,000. Analysis has been made by Prof. Cook. The water is pure and soft, and has given general satisfaction.

SALEM.

Salem has a population of 5,516. There are in the city 1,291 dwellings. The water-supply was introduced in 1882. The plant is owned by the city. The water is obtained from a stream (Quinton's creek) and a well. The well is 20 feet in diameter and has a depth of 33 feet. The supply station is 3 miles from the town. The water is pumped direct. The number of houses supplied is 350. There

are a few houses outside of the city limits which are connected with the supply. There are $8\frac{1}{2}$ miles of iron pipe, running in size from 12 to 4 inches in diameter. There is no known pollution of the supply. The water has taste at times, especially during drought. The pond has a capacity of 55,000,000 gallons, and the average daily consumption is 450,000 gallons. The pipes are thoroughly flushed every week. The water from the well is quite hard. The commingling of the water from the well and from the pond has not improved the water very perceptibly. Analysis has been made of the well-water, but not of the pond-water. The average pressure is from 45 to 50 pounds. The supply should be improved by some method which will overcome the disagreeable taste.

SOMERVILLE.

Somerville has a population of 3,316. There are 621 houses. The water-supply was introduced in 1882, and is owned by a private company. The source of supply is the Raritan river. The water is taken from the stream at Raritan. The reservoir is a stand-pipe 150 feet high and a diameter of 10 feet. The capacity is 88,077 gallons. The intake is in the middle of the river, where the water has a depth of 3 feet. In summer it sometimes is only 6 inches. There are in Somerville and Raritan 6 miles of pipe. The mains are 12 and 10 inches. Distributing-pipes, 4 inches. There are 275 houses using the supply. The daily consumption is 350,000 gallons. The water was formerly turbid and had some taste at times. Hyatt filters were introduced, and since that time the water has been pure and clear. The water now gives entire satisfaction at all times, and should be used by more families.

TRENTON.

The estimated population of the city at present is 60,000. The number of houses not estimated. The original charter is dated 1801, and the water was then derived from a spring. The city purchased the plant in 1859. The supply is now obtained from the Delaware river. The water is pumped to a reservoir situated near Pennington avenue. This is divided into three compartments. The water enters the middle of the reservoir and is taken from the ends. The reservoir is 100 feet above sea-level. It has a capacity of

20,000,000 gallons. The water at the pumping station is pumped from a well, and there is also a water-wheel in use, which pumps direct. The sizes of pipe vary from 4 inches to 16 inches for distributing, and the main is 36 inches in diameter. The system is well looped. There are 11,000 houses supplied. The pressure is about 30 pounds. There are some meters, and also the water is supplied by contract. The capacity is only limited by power of pumps. The consumption is 3,000,000 gallons per day. The supply is only affected by rains, which have a tendency to make the water cloudy.

VINELAND BOROUGH.

Population, 3,150. Estimated number of houses, 600. Water-supply by driven wells—number, 38. Introduced and owned by Charles Keightly. Introduced 1886. Taken by 275 houses. The wells go through alternate layers of clay and sand to an average depth of 50 feet. But one coupling of the pipe, about 20 feet down. The pipe is galvanized, of two-inch diameter, and over the holes at the joint is a brass wire gauze, to keep out coarse sand. The temperature of the water is 56°. The water rises in the pipes 34 to 35 feet without suction. Twenty-six of the wells are in a radius of 20 feet and the rest near. At first driving there was a supply of 60 gallons a minute from several wells within a seven-foot diameter. From 26 put in a twenty-foot diameter we get 110 gallons a minute. When we attach 12 that are outside we get 135 gallons a minute. No signs of decrease. Since the blizzard to April, when examination was made, water had risen 12 to 15 feet, and owner says that there is more water in the ground than in 20 years before. The surface around the wells is guarded, although the owner thinks there is no danger of contamination from the upper soil, by reason of the successive layers of tenacious clay before reaching the water-bearing strata. Water distributed to houses in iron pipes. Mains 10 inches. Tested with pressure of 300 pounds. House connections 3½ inches, and made by plumbers. The quality of the water has been satisfactory. The wells were the private enterprise of an enterprising man, who does not seem very anxious to realize profit. Charges are reasonable, and he is willing and likely to make transfer to the borough or to a company at reasonable compensation.

WASHINGTON. •

Washington has a population of 2,597. There are 556 houses in the borough. The water-supply, which is owned by a private company, was introduced in 1882. The supply comes from springs on Scott's mountain. The reservoir is situated at Roaring Rock. It is 250 feet above the level of the square in the borough. The water flows by gravity. The main is 10 inches in diameter. The pipes are of cast iron, of which there are 5 miles, the smallest used being 4 inches in diameter. There are 25 hydrants. The pressure is 52 pounds. There are a few meters used. Three hundred and twenty houses are connected. The dead ends, four in number, are regularly flushed. The water is very good and the supply is ample. No complaints have ever been made.

WENONAH.

Wenonah has a population of 487. There are 61 houses. The works were constructed in 1886. Designed by R. D. Wood & Co. The works are owned by a private company. The water is taken from a pond supplied by springs. The water is pumped from a well at the head of the pond. The surrounding soil is light and sandy. The pond covers about an acre. It was a natural basin and has a sand bottom. The water is pumped to a cedar tank, 25 feet in diameter and 16 feet high. This tank is upon a sixteen-foot trestle. The capacity is 60,000 gallons. There is 1 mile of pipe. There are 50 taps and 11 fire-plugs. The average pressure is 40 pounds. The price of the water is regulated by a schedule. Pipes vary in size from 6 to 2 inches. The winter consumption is 10,000 gallons per day, and that of the summer is 40,000 to 50,000 gallons for the same time. The system is well looped, and the water gives entire satisfaction.

WOODBURY.

Woodbury has a population of 3,278. There are 712 houses. The works were built in 1886-87. Designed by Carson & Murphy. There have been no additions. Works are owned by the city. The source of supply is the headwaters of Mantua creek, 4½ miles from town. This represents a large water-shed. Water originally comes

from cedar swamps back of Glassboro, and also from three marl-beds. The water is pumped to a reservoir 1 mile out of town. The reservoir is 40 feet square and 14 feet in depth. It is divided into two compartments. The water enters the bottom of the reservoir at one end and is taken from the center of each compartment. The division embankment is 6 feet in height. There are 12 miles of pipe. Twelve-inch main. Three hundred and thirty-five permits have been issued. Pressure 30 to 55 pounds. Water is supplied on a schedule of prices. There are 59 hydrants. There is a single brass screen filter at the intake. The capacity is 500,000 gallons. The average consumption is 60,000 gallons. Three taps are supplied out of the city. The pipes are of cast iron. The small pipes run to 4 inches in diameter. The water is pleasant and soft. An analysis was made in 1885, and was printed in the engineer's report at that time.

DISEASES OF WORKERS IN TEXTILE GOODS.

BY J. W. STICKLER, M.D., AND F. B. LANE, ORANGE;
AND J. B. STUBBART, M. D., BLOOMFIELD.

INTRODUCTION BY SECRETARY.

(Inquiries into State Industries, Continued from Previous Reports.)

In previous reports this Board has given considerable attention to those industries of the State in which there is apt to be risk to the health of operatives. Experience long ago proved that it is not always safe to leave this matter to the intelligence and good intent of the employers, or to the good judgment of those employed. There are many industries that at best tend to impair health, and as to which we need to inform ourselves and to apply the best methods of relief. There are many others that can be pursued consistently with health, but which, by reason of improper modes of heating and imperfections of ventilation, constantly imperil the health of some of those employed. It is the high duty of the State to see to it that those upon whom it must depend for productive labor, are enabled to pursue that labor without undue peril to health and life. Hence, all machinery should be properly guarded, all factories should be examined by those expert in detecting the causes of ill health or undue exposure, and those of younger age should be protected from kinds and degrees of work unfavorable to full development and to proper schooling. While the laws of this State now provide for the inspection of factories, there are still many improvements to be made. So far as sanitary conditions are concerned, this should be under the surveillance of the State Board of Health. We cannot review the various foreign Blue-books and other State records, without seeing how wisely legislation has provided for such skilled Inspectors in most countries. The defect applying to the greatest number of indoor trades and occupations is that arising from imperfect modes of ventilation.

We quote some suggestions from a paper of Mr. William Tattershall, an excellent authority, read at the ninth meeting of the Sanitary Institute of Great Britain :

“ VENTILATION OF FACTORIES AND WORKSHOPS.

“ The construction of factories or rooms will govern the application of any system of ventilation to them. The ordinary method of ventilating weaving and other sheds has, I think, usually been inefficient by reason of the contrivances for exhausting the foul air being inadequate at their best and uncertain in action when most needed, and also because the inlets for fresh air were not under control as to the quantity, temperature or direction of the air admitted. The best results have been achieved by placing one or more exhaust ventilators near the center of shed roof and arranging the inlets at regular distances around the walls. The amount of air to be passed through will depend on the temperature and rate of pollution inside, and the inlets may, if needed, be carried down from the roof, and the entering air warmed, cooled or moistened at pleasure ; there are plenty of appliances to be had by which air can be admitted without draft. A series of rooms one above the other may, if not too large, be dealt with by one exhaust ventilator, placed at the top of a vertical shaft extending through the several stories and with outlets from each room, the inlets for fresh air to each room being so arranged that the air may, in its course from inlet to outlet, traverse the room, and especially that part in which the greatest source of pollution exists. It is obvious that a series of small rooms on the same floor level may be dealt with in a similar way by a horizontal air duct with openings to each room and inlets as suggested above.

“ In storied rooms too large to be dealt with in this manner, each room may be treated separately, and many large work-rooms are so treated, by having one or more exhaust-fans placed on one side of the room and fixed either to discharge through windows or openings specially made. The inlets in this case would be arranged on the opposite side of the room to the fan, and possibly at the ends, if required, so as to cause the current of air to traverse the sources of pollution, whether dust, heat, fumes or steam. Generally, the requisite effect in the removal of polluting matters is obtained by running the fans entirely free from any kind of tubes on the feed or room side ; and where possible this is best, as less power is needed to drive them and more air is moved when the area of feed is unrestricted. There are, however, some cases in which it is necessary, and many in which it is advisable, to carry away polluting matters immediately they are set free, so as to prevent their distribution in the atmosphere. In these cases it becomes necessary to construct tubes with openings near

the source of pollution and connected at the other or exit end with a fan, which, when working, produces a powerful exhaust and carries away the polluting matter as fast as it is produced. This arrangement may be and is applied with perfect success to remove dust, heat, steam and fumes of various kinds. The tubes may be carried overhead, underneath or level with the sources of pollution, and the impurities carried away may be dealt with in a chamber, so as to retain them and allow the air to escape pure."

The last two reports of the Chief Inspector of Factories and Workshops of Great Britain (1886 and 1887) contain some valuable suggestions.

Mr. Crompton thus speaks on the subject of ventilation :

" I am glad to be able to note an increase in my district during the past year, of the use of the ' Blackman air-propeller ' for ventilating china-scouring rooms, fettling and polishing-shops, and flint-mixing and sifting-places in potteries, gassing-rooms in cotton factories, and vat-rooms in breweries.

" There is one simple and economical means of ventilation of upper rooms of factories which is nearly always satisfactory, and the adoption of which I have almost daily the opportunity of recommending, and which architects and builders seem to me to unaccountably neglect. I mean that of ventilating ridge-tiles on the ridge of roof. I enclose a page of designs of these tiles made at numerous tileries in this district. The cost is very little more than the ordinary ridge-tile which they replace ; they effectually take away the foul air, and there is scarcely any trouble about draughts from this use. Any room at the top of a building may very easily be ventilated in this manner, especially if not ceiled ; but if ceiled, it is easy to make a few holes in the ceiling, covered, if need be, with perforated zinc.

" I also enclose drawing showing Thompson's patent ventilating-ridge, made by Mr. Peake, of the Tileries, Tunstall, which, by a system of air-flues, ventilates all rooms in a building. It has the advantage of being very ornamental in appearance, and is said to be effective in use. As nearly all factories and workshops have a ridge, it may as well be a ventilating-ridge, and if all parts of the building are connected by air-flues with the roof, every part will be permanently and constantly ventilated by the exhaustion of foul air through the ridge-tiles. Whatever may be the direction of the wind, there is a constant current of air through this ridge, sucking out the foul air from below. Another advantage about this system of ventilation is that it cannot get out of order, requires no attention, and will last as long as the building lasts.

"Owing to the very simplicity and inexpensiveness of this efficient

(ventilating ridge-tile) mode of ventilation, it is in danger of being overlooked, and I have, therefore, the greater pleasure in bringing it under your notice, and under that of architects, builders, and occupiers of factories and workshops.

“ VENTILATING-RIDGES AND AIR-BRICKS.

“ *Made in blue, red, and brown colors.*

“ During the past year the system of electric lighting has been introduced into a brewery, flour mill, pottery, and an iron mill in my district, to say nothing of private houses and a church. Beyond its great utility as a mode of illumination, it has incidental advantages in reducing risk of fire and explosion, and in keeping the atmosphere pure, instead of fouling it with the products of combustion. In the case of flour mills, its use is of especial service in those respects, and in reducing the oppressive heat.

“ Even under the most perfect system of ventilation, and after every effort is made to insure cleanliness, there are still some manufacturing processes which are more or less injurious to health owing to the inhalation of dust. Of these I may mention china-scouring, earthenware-polishing, and majolica-painting in potteries, and work in flour mills and rag-sorting places.

“ I have tried hard to overcome the prejudice of the workers against the use of respirators, but with very little success. The ‘Nose and Mouth Protector’ made by Squire, of Oxford street, London, and shown in the Health Exhibition, is very cheap and effective. At a cotton mill I found some women put to the work of printing labels and wrappers, and two of them using bronze powder in a most reckless manner, without any knowledge of its danger. They complained of headache and sickness, and no wonder. I recommended Squire’s respirators, which they have worn for twelve months without discomfort and with freedom from headache or sickness.”

A similar respirator is manufactured in this country, known as the Hurd Patent Respirator (Morley Respirator Co., East Saginaw, Mich.) We have known them used with advantage.

There are some factories in which the system of ventilation described by Dr. I. G. Pinkham is as applicable and economical as for school-houses. See, in full, article “The Ventilation of School-Rooms Heated by Stoves.” (Massachusetts Report of Board of Health, 1887.)

The subject to which we give especial attention this year is “*Diseases of Workers in Textile Goods*,” as studied by J. W. Stickler, M.D., and F. B. Lane, of Orange, and J. E. Stubbart, of Bloomfield.

DISEASES OF WORKERS IN TEXTILE GOODS.

We will consider (1) the various processes of manufacture; (2) the hygienic condition of the rooms in which the operators work; (3) the physical condition of the employes, and then present some ideas as to apparatus which might be used for the removal of the dust-fibers, vapors and gases which pervade certain departments. Let us begin with the various processes of manufacture in

WOOLEN GOODS.

The wool comes to the factory in large bales, and is taken to the sorting-room and placed upon tables, where it is sorted over and graded. The temperature in this room is from 75° to 80° F. There is but little dust-fiber in this department.

From the sorting-room it is taken to the scouring-room. In scouring, solutions of soda-ash, salt and other alkalies are used. From the scourers it goes to the dyers, and is submitted to a bath of indigo, logwood and other coloring substances in solution. Next, the wool is taken to the drying-rooms and placed upon racks, hot air from steam-pipe coils being the drying agent.

The next step is that of "picking." This is accomplished in the following manner: The wool is first saturated with an emulsion of lard oil and water, then it is put into a cleaning or burring machine, by which burs and other foreign substances are separated from the wool-fibers.

It might be in place here to mention that in the process of manufacture of coarse yarns for a coarse grade of blankets, South American wool is used, and it contains a large amount of lime, which is used to remove the wool from the pelts. The wool, instead of being scoured, is sent direct from the sorting-room to the picking-room, and without being subject to the emulsion of oil, it is put through the burring-machine. This part of the work is very dusty and irritating to the air-passages, of which mention will be made.

The next in order is the "carding." The wool is placed in the carding machine, and is subject to the combing process (as it is termed). It is treated by coarse, fine and finishing combs, and run on long spools, and is then carried to the spinning-room, to be spun on bobbins

of various lengths. The bobbins are then taken to the warping-room, and the long fibers of wool changed from the bobbins to large spools. They are passed in turn through the warping machine, and treated with glue, on the way, and then passed over heating-drums to large rollers.

The next room is the weaving, from which the cloth goes to the finishing-room, to be put through the fulling process, or "raising the nap" (as it is called), which is done by passing the cloth on rollers swiftly over the points of teasels, or fullers' plant, as it is termed.

The cloths or blankets are then ready to be trimmed and shipped.

This constitutes a brief description of the processes of manufacture in the different departments.

We will now consider briefly the hygienic condition of the sorting and picking-rooms.

These rooms, as a rule, are large, well lighted, comfortably heated and generally furnished with ventilators. An exception to this was found in a "shoddy factory" which I visited. The ceilings were low, with no system of ventilation; a thick dust pervaded the atmosphere, and the rag-sorters (mostly Italian women) all showed evidence of nasal and bronchial irritation; in some cases the nose was sore and the anterior nares seemed almost plugged with dirt and dust-fiber. A system of ventilation, and the use of exhaust-fans, for the removal of the dust-fiber, ought to be used, which would add greatly to the comfort and health of the employes.

Let us examine into the physical condition of the employes in these departments.

No. 1. Aged 23; 4 years in business; no catarrh or bronchitis; health good; uses beer and tobacco.

No. 2. Aged 19; 2 years in business; health good; never was ill; uses beer.

No. 3. Aged 29; 6 years in business; has catarrh; takes cold easily; thinks his work aggravates the catarrh; uses tobacco.

No. 4. Aged 48; 13 years in business; health good; uses beer and tobacco.

No. 5. Aged 28; 9 years in business; no catarrh; has had malarial fever; is well now; uses tobacco.

No. 6. Aged 31; 5 years in business; health good; never was ill; uses beer and tobacco.

No. 7. Aged 28 ; 7 years in business ; no catarrh or bronchitis ; good health ; uses beer and tobacco.

No. 8. Aged 30 ; 6 years in business ; has had nasal catarrh a little ; attributed it to taking cold ; health good ; uses sponge to protect mouth and nose while picking the dry wool ; uses beer and tobacco.

The Superintendent, who has been in the manufacture of woolen goods for fifty-nine years, told me he considered the picking-room, where the coarse foreign wools were sent dry to the pickers, the most injurious to health of any of the departments, and was free to confess that any one with weak respiratory organs should not be employed in this department. Only eight men were employed in this department, as a few men will take care of a large amount of wool. We learn from these statements that of eight employes two have had catarrh, of which one does not attribute it to his work ; one has had malarial fever, but is in good health now, while the rest have had good health. Six use tobacco and stimulants.

The next rooms to be hygienically considered are the scouring and drying-rooms. The conclusions any one would draw as to the probable effect of the various kinds of exposure upon the health of the men who work in these rooms, from what you see when you first enter the apartments, would be that men cannot long endure such treatment without having their health impaired. The atmosphere is loaded with dense steam and gases from the dye-tubs, the floors are wet, and all the timbers and machinery are dripping with water. Theoretically, we should have here congested pulmonary capillaries, tendency to pneumonia, bronchitis, rheumatism and allied affections. Let us hear what the men say, without getting the detailed interview with each one separately. I will give a statement of their report.

Out of 18 dyers interviewed, only 3 report rheumatism, 1 catarrh, 1 has had malaria, 13 report that their health has not been affected by their occupation. Fourteen use tobacco and stimulants.

Undoubtedly, where we have so dense a vapor, we will get some capillary congestion without the naturally looked-for morbid processes following. We also find evidence of some rheumatic trouble, but not to that degree we would expect where the men are exposed continually to the moist heat of these departments.

The next departments to be considered hygienically are the carding, spinning and weaving-rooms. We will consider them collectively, as they are very similar in their surroundings. We find them well lighted,

heated, and, to some extent, ventilated. There is comparatively little dust in these rooms, the wool being so thoroughly saturated with oil that it holds the wool-fiber intact; the only place I found any was in the manufacture of coarse yarns, from the coarse foreign wools. There is a fine dust-fiber, which is termed by the men, "dead hair." It does not take the oil, and is found floating in the atmosphere to a limited extent.

Let us now consider the physical condition of the employes. Out of 50 operatives questioned in their different departments, only 2 had catarrh, 2 bronchial irritation, 1 rheumatism, 2 malaria, 44 expressed themselves as enjoying good health, and considered their occupation a healthy one. Twenty-four use tobacco and stimulants. We might expect to find more disease than is here shown to exist, but careful investigation does not bring it out.

From the weave-room, the cloth passes to the "gigging" or "fulling" machine, and from that to the finishing and packing departments, of which further mention need not be made.

Out of 76 workers in woolen goods, only 5 have catarrh, 4 rheumatism, 1 bronchitis, 4 malaria. Forty-four use tobacco and beer. I would liked to have furnished a larger list of employes interviewed, and also present tables showing the death-rates and cause of death in the factories, but was unable to get them. It was only after much effort that I could get the facts. Dr. Stubbart, fortunately, was more successful, and I append the following tables from him.

"The mill of Thos. Oakes & Co. employs about 150 hands, and shows, for the past ten years, a mortality of four per cent., or a total of six deaths. The causes of death were: Bright's disease, 1, aged 53; apoplexy, 2, ages 62 and 74; heart disease, 1, aged 55; accident, 1, aged 19; suicide, 1, aged 71. Not one of these deaths occurred from lesions contracted in the mills.

"The appended table includes records of hands from the

DISEASES OF WORKERS IN TEXTILE GOODS. 167

Mills of Thomas Oakes & Co., in Bloomfield, and of Mr. Underhill, in Franklin.

Number.	Sex.	Age at entering mill.	Present	Number of years in mill.	Diseases inherited or acquired before entering mill.	Diseases acquired since entering mill.	Use of alcohol or tobacco.
1	Male	19	■	8			Tobacco.
2	"	8	23	15			Tobacco.
3	"	26	33	7			Lager.
4	"	47	50	■			Tobacco.
5	"	18	34	6			Tobacco.
6	"	17	17				
7	"	35	38	3			Tobacco.
8	"	24	28	4			Tobacco.
9	"	29	■	10			
10	"	40	■	18			
11	"	23	51	28			
12	"	24	28	■			Tobacco.
13	"	14	15	■			
14	"	15	17				
15	"	15	17	2			Tobacco
16	"	45	47	2			Tobacco.
17	"	15	30	15			
18	"	■	52	13			{ Tobacco and lager.
19	"	20	21	1			Tobacco.
20	"	■	18	1			
21	"	14	18	2			
22	Female	14	17	■			
23	Male	16	16				
24	"	17	17				
25	Female	17	65	48			
26	Male	13	35	22			
27	"	29	49	20		{ Malarial Neuralgia. }	Tobacco.
28	Female	■	19				
29	Male	14	16	2			Tobacco
30	Female	■	16	1			
31	"	16	17	1			
32	Male	14	30	16	{ Cephalalgia. Now well. }		
33	Female	14	18	4			
34	"	14	17	■			
35	Male	15	■	3			
36	Female	15	17	2			
37	"	15	20	■			
38	Male	■	61	31		{ Malarial Cephalalgia }	
39	"	29	49	20			

Mills of Thomas Oakes & Co., in Bloomfield, and of Mr. Underhill, in Franklin—Continued.

Number.	Sex.	Age at entering mill.	Present age.	Number of years in mill.	Diseases inherited or acquired before entering mill.	Diseases acquired since entering mill.	Use of alcohol or tobacco.
40	Male	41	60	19	.....	.....	{ Tobacco and lager.
41	"	15	15	.....	.....	.....	.....
42	"	14	15	1	.....	.....	.....
43	"	14	14	.....	.....	.....	.....
44	"	14	23	9	.....	.....	Tobacco.
45	"	16	18	2	.....	.....	.....
46	"	15	15	.....	.....	.....	.....
47	"	15	16	1	.....	.....	.....
48	"	40	70	30	.....	.....	{ Tobacco and lager.
49	"	14	18	4	.....	.....	.....
50	"	14	14	.....	.....	.....	.....
51	"	13	15	2	.....	.....	.....
52	"	14	16	2	.....	.....	.....
53	"	14	14	.....	.....	.....	.....
54	"	14	14	.....	.....	.....	.....
55	"	14	15	1	.....	.....	.....
56	"	14	15	1	.....	.....	.....
57	Female ..	14	17	3	.....	{ Anæmia.... Now well.. }	.....
58	" ..	19	20	1	.....	.....	.....
59	Male	26	36	10	.....	.....	.....
60	"	19	31	12	.....	.....	{ Tobacco and lager.
61	"	22	44	22	.....	.....	Lager.
62	"	14	24	10	.....	.....	.....
63	Female ..	24	28	4	.....	.....	.....
64	Male	34	46	12	.....	.....	.....
65	Female ..	15	20	5	.....	.....	.....
66	" ..	18	19	1	.....	.....	.....
67	" ..	15	17	2	.....	.....	.....
68	" ..	13	19	6	.....	.....	.....
69	Male	15	18	3	.....	.....	Tobacco.
70	"	46	66	23	.....	.....	.....
71	"	30	65	35	.....	Conjunctivitis...	.....
72	Female ..	15	18	3	.....	.....	.....
73	" ..	24	27	3	.....	.....	.....
74	" ..	21	26	5	.....	.....	.....
75	" ..	15	20	5	.....	.....	.....
76	Male	22	34	12	.....	.....	{ Lager and Tobacco.
77	Female ..	15	24	9	.....	.....	.....

Mills of Thomas Oakes & Co., in Bloomfield, and of Mr. Underhill, in Franklin—Continued.

Number.	Sex.	Age at entering mill.	Present age.	Number of years in mill.	Diseases inherited or acquired before entering mill.	Diseases acquired since entering mill.	Use of alcohol or tobacco.
78	Female ..	16	23	7	.....	.....	.....
79	Male	30	33	3	.....	.....	.....
80	"	16	23	7	.....	.....	.....
81	"	15	28	13	.....	.....	.....
82	Female ..	15	24	9	.....	.....	.....
83	Male	32	60	28	.....	.....	.....
84	Female ..	17	18	1	.....	.....	.....
85	" ..	14	14	.....	.....	.....	.....
86	Male	20	40	20	.....	.....	.....
87	"	17	44	27	.....	.....	.....
88	Female ..	16	19	3	.....	.....	.....
89	Male	15	25	10	.....	.....	.....
90	Female ..	17	19	2	.....	.....	.....
91	" ..	26	38	12	.....	.....	.....
92	" ..	17	20	3	.....	.....	.....
93	Male	16	22	6	.....	.....	.....
94	Female ..	14	23	9	.....	.....	.....
95	Male	15	71	56	.....	.....	.....
96	"	10	26	16	.....	.....	Tobacco.
97	"	17	30	13	.....	.....	.....
98	"	17	59	42	.....	.....	Tobacco.
99	"	13	32	19	.....	.....	Tobacco.
100	Female ..	32	37	5	.....	.....	.....
101	" ..	15	19	4	.....	.....	.....
102	" ..	14	18	4	.....	.....	.....
103	" ..	17	18	1	.....	.....	.....
104	" ..	18	38	20	.....	.....	.....
105	" ..	15	20	5	.....	Erysipelas.....	.....
106	" ..	25	27	2	.....	Hay asthma.....	.....
107	" ..	22	27	5	.....	.....	.....
108	" ..	20	40	20	.....	.....	.....
109	" ..	15	18	3	.....	.....	.....
110	" ..	17	23	6	.....	.....	.....
111	" ..	21	26	5	{ Nasal catarrh. } { Now better... }	.....	.....
112	" ..	13	18	5	.....	.....	.....
113	" ..	19	24	5	.....	.....	.....
114	" ..	17	18	1	.....	{ Bronchitis.. } { See notes... }	.....
115	" ..	23	25	2	.....	.....	.....
116	" ..	15	18	3	.....	.....	.....
117	" ..	17	19	2	.....	.....	.....
118	" ..	19	25	6	.....	.....	.....

Mills of Thomas Oakes & Co., in Bloomfield, and of Mr. Underhill, in Franklin—Continued.

Number.	Sex.	Age at entering mill.	Present age.	Number of years in mill.	Diseases inherited or acquired before entering mill.	Diseases acquired since entering mill.	Use of alcohol or tobacco.
119	Female ..	15	21	6	.....	.....	.....
120	Male	13	17	4	.....	.....	.....
121	"	16	19	3	.....	.....	.....
122	"	25	45	20	.....	.....	Tobacco.
123	"	20	26	6	.....	.....	.....
124	"	14	23	9	.....	.....	Tobacco.
125	"	14	24	10	.....	.....	.....
126	"	10	70	60	.....	.....	{ Lager and Tobacco.
127	"	16	16	.....	.....	.....	.....
128	"	19	24	5	.....	.....	Tobacco.
129	"	21	23	2	.....	.....	Tobacco.
130	"	15	24	9	.....	.....	Tobacco.
131	"	12	14	2	.....	.....	.....
132	"	10	48	38	.....	.....	Tobacco.
133	"	16	16	.....	.....	.....	.....
134	Female ..	20	25	5	.....	.....	.....
135	" ..	15	16	1	.....	.....	.....
136	" ..	16	21	5	.....	.....	.....
137	" ..	16	18	2	.....	.....	.....
138	" ..	15	21	6	.....	.....	.....
139	" ..	15	18	3	.....	.....	.....
140	" ..	10	40	30	.....	.....	.....
141	" ..	15	16	1	.....	.....	.....
142	Male	14	28	14	.....	.....	.....
143	"	13	17	4	.....	.....	.....
144	Female ..	19	19	.....	.....	.....	.....
145	" ..	15	21	6	Scrofula .....	.....	.....
146	Male	15	17	2	.....	.....	.....
147	"	19	19	.....	.....	.....	.....
148	"	19	21	2	.....	.....	.....
149	"	16	30	14	.....	.....	Tobacco.
150	"	24	39	15	.....	.....	Tobacco.
151	Female ..	13	14	1	.....	.....	.....
152	" ..	19	21	2	.....	.....	.....
153	" ..	19	22	3	.....	.....	.....
154	" ..	17	23	6	.....	.....	.....
155	" ..	15	19	4	Scrofula .....	.....	.....
156	" ..	14	18	4	.....	.....	.....
157	" ..	26	29	3	.....	.....	.....
158	" ..	16	19	3	.....	.....	.....
159	" ..	18	24	6	.....	.....	.....
160	" ..	20	24	4	.....	.....	.....

Mills of Thomas Oakes & Co., in Bloomfield, and of Mr. Underhill, in Franklin—Continued.

Number.	Sex.	Age at entering mill.	Present age.	Number of years in mill.	Diseases inherited or acquired before entering mill.	Diseases acquired since entering mill.	Use of alcohol or tobacco.
161	Female ..	14	18	4	.....	.....	.....
162	" ..	21	21	.....	.....	.....	.....
163	" ..	16	16	.....	.....	.....	.....
164	" ..	14	19	5	.....	.....	.....
165	" ..	21	25	4	.....	.....	.....
166	" ..	21	21	.....	.....	.....	.....
167	" ..	16	22	6	.....	.....	.....
168	" ..	16	17	1	.....	.....	.....
169	" ..	20	26	6	.....	.....	.....
170	" ..	12	18	6	.....	.....	.....
171	" ..	13	19	6	.....	.....	.....
172	" ..	16	22	6	.....	.....	.....
175	" ..	16	22	6	.....	.....	.....
176	" ..	16	18	2	.....	.....	.....
177	" ..	11	17	6	.....	.....	.....
178	" ..	15	21	6	.....	.....	.....
179	" ..	15	21	6	.....	Eczema .....	.....
180	" ..	15	21	6	.....	.....	.....
181	" ..	13	19	6	.....	.....	.....
182	Male	20	26	6	.....	.....	Tobacco.
183	"	23	48	25	.....	.....	{ Lager and Tobacco.
184	"	18	21	3	.....	.....	Tobacco.
185	"	16	18	2	.....	.....	.....
186	"	28	40	12	.....	.....	Tobacco.

NOTE.—After a careful investigation by myself (Mr. Lane), and from the report of Dr. Stubbert’s tables, I think we may be safe in concluding with him that while there is a slight tendency to bronchitis, catarrh and rheumatism, workers in wool are to be congratulated on having an occupation which is not necessarily unsafe or unhealthy. But there is need of more care as to dust.

COTTON GOODS.

We will treat this subject in the same manner as we did the woollen industry, as the processes of manufacture are much the same, especially in the departments in which we are interested. The cotton

comes to the factories in large bales, and is sent to the picking-room, where it is fed by girls into the first set of pickers or "scutchers," which swiftly pull the matted locks and wads to shreds, and beat out the heavier dirt, seed, &c. The cotton issues from these machines in a continuous sheet of wide batting, which is rolled up and passed on to the second and third set of scutching machines. It is delivered from these in a downy roll of "lap," as it is termed. The next stage of the refining process is the "carding-room." The "lap" or roll of cotton is fed into the carding machine, and comes in contact with a large cylinder, swiftly revolving, and covered with fine wire teeth, so fine and close that there are 90,000 of them on a square yard of surface. These comb or brush away the cotton from the edge of the "lap," and in so doing naturally lay the fibers parallel. It then passes on to other cardings and combings, and is finally reeled off on large spools, and is sent to the spinning-room, where it is spun down into a fine warp; now it is ready for the warping or weaving-rooms, if to be made into cloth. If it is to be used for manufacture of thread, it is sent from the spinning-room to the reeling-room and reeled off into skeins, and sent to the dye-house, if for colored threads, and if for white, it is sent to the bleaching department, then to the drying-rooms, and from there to the different finishing departments.

We will now examine into the hygienic condition of the different departments. Beginning with the picking-room, we find this room well lighted and heated, but not well ventilated. The atmosphere is full of fine dust and cotton fiber; we should expect to find here a series of catarrhs and bronchial irritation. Let us see what we find after examining into the physical condition of the women employed.

No. 1. Age, 29; 11 years in business; no catarrh or bronchial trouble; health good.

No. 2. Age, 31; employed 4 years; no catarrh or bronchial trouble; health good.

No. 3. Age, 26; 6 years in business; has catarrh and headache.

No. 4. Age, 27; employed 5 years; no catarrh or bronchial trouble; health good.

No. 5. Age, 33; 7 years in business; has sore throat and catarrh; says, "dust irritates, is the trouble."

No. 6. Age, 24; employed 7 years; no catarrh or other trouble; good health.

No. 7. Age, 19; employed 4 years; has catarrh (pharyngeal); otherwise good health.

No. 8. Age, 22; employed 3 years; no catarrh or bronchial trouble.

No. 9. Age, 35; employed 6 years; no catarrh or bronchial trouble; health good.

No. 10. Age, 38; employed 20 years; no catarrh or bronchial trouble at present; takes cold easily; dust makes it worse.

We have, out of the 10 employed in the picking department, 4 who have catarrh or sore throat, 1 having headache with the catarrh. So we see that the inhalation of so much dust-fiber is a source of disease to the respiratory organs.

The next to be considered are the carding and spinning-rooms. As a rule these rooms are well lighted and ventilated, but the heat is almost tropical, the temperature ranging from 80° to 90° F. The atmosphere, besides being overheated, is filled with fine dust-fiber. Our first impression is that a person could not long endure such an overheated air. The majority of workers in the carding-room are women. Let us hear their own report as to the effect of the work upon them.

No. 1. Age, 18; employed 4 years; no catarrh or throat trouble; health good.

No. 2. Age, 21; 3 years in business; no catarrh or bronchitis; has headache.

No. 3. Age, 30; employed 8 years; no catarrh or throat trouble.

No. 4. Age, 25; employed 5 years; has catarrh and headache.

No. 5. Age, 20; employed 2 years; no catarrh or bronchial irritation; good health.

No. 6. Age, 31; in business 6 years; no catarrh; has malaria.

No. 7. Age, 18; in business 4 years; no catarrh; has headache.

No. 8. Age, 27; in business 5 years; no catarrh or bronchial trouble.

No. 9. Age, 28; employed 10 years; no catarrh; has headache.

No. 10. Age, 35; in business 9 years; no catarrh or throat trouble; good health.

No. 11. Age, 32; in business 6 years; has catarrh; no headache; uses tobacco and beer.

No. 12. Age, 29; in business 11 years; no catarrh or throat trouble; uses beer and tobacco.

No. 13. Age, 35; in business 13 years; has headache and malaria; uses beer and tobacco.

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No. 14. Age, 29 ; in business 14 years ; no catarrh ; good health ; uses beer and tobacco.

No. 15. Age, 23 ; in business 5 years ; no catarrh or throat trouble ; uses tobacco.

No. 16. Age, 39 ; employed 12 years ; no catarrh or headache ; good health ; uses beer.

No. 17. Age, 20 (girl) ; in business 4 years ; no catarrh or sore throat.

No. 18. Age, 19 ; employed 3 years ; no catarrh or headache ; good health.

No. 19. Age, 20 ; in business 2 years ; no catarrh ; has had bronchitis.

We will next examine the spinning-room. In this department the temperature is 90° F., while the carding-room is about 80° F. There is not so much dust as in the spinning-room. The Superintendent told me that some of the men on first entering could not endure the intense heat, but those who could soon became accustomed to it and apparently enjoyed good health. On questioning, we obtain the following :

No. 1. Age, 40 ; in business 13 years ; no catarrh or bronchial trouble ; good health ; uses beer and tobacco.

No. 2. Age, 31 ; employed 11 years ; no catarrh or headache ; uses tobacco and beer.

No. 3. Age, 22 ; in business 8 years ; in good health ; uses beer and tobacco.

No. 4. Age, 44 ; employed 2 years ; no throat or bronchial trouble ; uses beer.

No. 5. Age, 38 ; in business 8 years ; no catarrh ; has headache.

No. 6. Age, 48 ; in business 18 years ; has catarrh ; poor health ; uses tobacco.

No. 7. Age, 28 ; in business 8 years ; good health ; uses beer and tobacco.

No. 8. Age, 18 ; in business 5 years ; has malaria ; uses tobacco.

No. 9. Age, 18 ; in business 2 years ; no catarrh ; good health.

No. 10. Age, 16 ; employed 1 year ; health good.

No. 11. Age, 20 ; employed 2 years ; has malaria ; no catarrh.

No. 12. Age, 31 ; employed 8 years ; good health ; uses beer and tobacco.

No. 13. Age, 24 ; employed 7 years ; has had bronchitis ; uses beer.

No. 14. Age, 22; in business 4 years; no catarrh; good health.

No. 15. Age, 24; in business 7 years; has catarrh; uses beer and tobacco.

No. 16. Age, 39; in business 19 years; never was sick; uses beer and tobacco.

Out of 34 questioned (of which 14 were women), 5 have catarrh, 6 have the headache, 3 suffer with malaria, 2 have had bronchitis, 16 use tobacco and stimulants.

While we find evidence of catarrh and bronchial trouble, we do not find it quite to that extent one would expect after examining into the hygienic conditions with which the operatives are surrounded. I confess to a severe irritation of the throat and bronchial tubes after being in the room for some time. The headache complained of was probably due to the excessive heat of the rooms.

The next room to be considered hygienically is the dyeing department. In this, as in the corresponding room of the woolen mills, we have an atmosphere loaded with dense steam, floors and walls saturated with water, and irritating gases rising from the coloring vats. Rheumatism, irritation of the respiratory organs and eyes should be expected. The testimony of the men is as follows:

No. 1. Age, 31; in business 9 years; has malaria; no rheumatism or catarrh; uses beer.

No. 2. Age, 29; employed 2 years; has good health; uses beer and tobacco.

No. 3. Age, 30; in the business 3 years; no rheumatism; good health; uses tobacco.

No. 4. Age, 44; in the business 6 years; has rheumatism; uses beer and tobacco.

No. 5. Age, 35; in the business 5 years; has sore eyes; uses beer and tobacco.

No. 6. Age, 45; in the business 6 years; has rheumatism; uses tobacco and beer.

No. 7. Age, 46; in the business 6 years; has rheumatism; uses tobacco and beer.

No. 8. Age, 39; employed 17 years; good health.

No. 9. Age, 50; in the business 20 years; no catarrh or rheumatism; uses tobacco and beer.

No. 10. Age, 48; in the business 7 years; has rheumatism and sore eyes; uses beer and tobacco.

No. 11. Age, 31 ; in the business 9 years ; good health ; uses beer and tobacco.

No. 12. Age, 37 ; employed 16 years ; no rheumatism ; good health ; uses tobacco.

No. 13. Age, 52 ; in the business 12 years ; has sore throat.

No. 14. Age, 33 ; in the business 6 years ; good health ; uses tobacco and beer.

No. 15. Age, 45 ; employed 22 years ; has rheumatism and sore eyes ; uses tobacco and beer.

Out of 15 employed in this room, 5 have rheumatism, 3 have sore eyes, 1 has malaria, 1 sore throat and 12 use tobacco and stimulants.

The bleaching-room was next examined. Chloride of lime is the agent used. The room is filled with steam and the floors are wet. Out of 13 men examined, we have this testimony : Three have the rheumatism, 2 have catarrh and sore throat, 1 has had pneumonia, 9 use tobacco and stimulants.

We find from a general summary of the different departments, that out of 72 employes questioned, 11 have catarrh, 7 have headache, 8 have rheumatism, 4 have malaria, 2 have had bronchitis, 3 sore eyes, 3 sore throat, 1 has had pneumonia, and 37 use tobacco and stimulants.

We might expect to find even more disease than is here shown to exist, for certainly the various kinds of exposure would justify such a belief. Rheumatism and catarrh seem to be the prevailing diseases. The report shows that workers in cotton suffer from diseased conditions much more than the workers in wool, owing to the large amount of dust and the overheated rooms. Professor Erismann, of St. Petersburg, states that he had "examined 100,000 workmen and found that, on an average, those engaged in textile industries were not as tall as other classes of workers. Their chest measurements and bodily weight were also inferior. These symptoms of degeneration of the textile workers were more particularly distinct among the spinners." Among men engaged in the cotton and linen manufacture in Lancashire, Dr. Ogle gives for phthisis a mortality figure of 272, against 220 for all males, while the relative figures for diseases of the respiratory system are 271 for the cotton industry, and 182 for all males. Dr. Ogle's figures are more in accordance with the general impression of the effects of cotton factory labor on the health of the workers.

The particularly unhealthy condition under which the textile trades

are carried on, are commented upon as follows, in the supplement to the last annual report of the Registrar-General. He says: "Among the textile industries there are two in which the death-rates are high, and unfortunately they are the two in which by far the largest number of persons are engaged, viz., the cotton industry of Lancashire and the woolen and worsted industries of the West Riding. The mortality figures in these industries are largely in excess; those of cotton being greater. It can scarcely be doubted that the main cause of the differences is to be found in the conditions under which the industries are severally carried on, and especially in the differences that they present in regard to the dustiness and the temperatures of their respective working-places." In the cotton factories, the temperature of the weaving-sheds is described in a recent (October, 1883,) report by Dr. Bridges to the Home Secretary, as "tropical and relaxing," and dust, composed partly of filamentous particles of cotton and partly of mineral substances used for sizing, is stated to be a notable feature in most of the sheds. It will be found also, on examining the tables, that the death-rates from diseases of the respiratory organs are very high in the Lancashire and West Riding towns, where the textile trades are mainly carried on, as the following extract from the supplement previously mentioned, also indicates. Writing of the effect of dust on the respiratory organs, he remarks: More injurious than either coal-dust, wood-dust or the dust of flour, appear to be the filaments and fluff and other dusts that are given off in textile factories; the mortality both from phthisis and from diseases of the respiratory organs being higher among workers in cotton and workers in wool, than among persons exposed to either of the previously-mentioned kinds of dust. The workers in cotton factories fare worse than the workers in wool, the comparative mortality from the disease in question being 543 for the former and 462 for the latter. It must be remembered, however, that the air in the weaving-sheds of cotton factories contains not only flocculent matter, but also a large amount of dust from mineral substances of various kinds, used in sizing, and that the inhalation of mineral substances, judging from industries which have been examined, is much more injurious than the inhalation of textile filaments. The deleterious effects of dust upon the air-passages is increased both in the cotton and in the wool factories, and especially in the former, by the high temperature in which the work

is carried on, and it is impossible to say how much of the lung mortality is due to the latter cause, and how much to the dust.

We pass now to a consideration of the means by which the evils can be lessened by an efficient system of ventilation. The main sources of impurities we have found to be as follows: Dust-fiber, excess of moisture, and heat. The construction of factories or rooms will govern the application of any system of ventilation to them. The ordinary method of ventilating factories has, I think, usually been inefficient by reason of the contrivances for exhausting the foul air being inadequate at their best, and uncertain in action when most needed, and also because the inlets for fresh air were not under control as to the quantity, temperature or direction of the air admitted. The remedy I would mention for the removal of these impurities is one I examined carefully while in Passaic. I visited while there the large "Dye and Print House" of Green & Barry, and through the courtesy of the Superintendent, Mr. Watson, I was shown their method for the removal of dust, steam, gases and heat. The system which they have adopted (which is the invention of Mr. Watson) is the large exhaust-fans, which are placed in the roofs and ends of the building. These fans are about two feet in diameter and make from 300 to 400 revolutions per minute. A system of ventilators is so placed for the inlet of pure air that all impurities are drawn or propelled toward the exhaust-fans, which rapidly draw in the dust and other matter and throw it out to the winds. On going out upon the roofs of the building and standing in front of the exhaust openings, one could readily see the practical workings of the system. Hot air, almost stifling, was issuing from the rooms, which were overheated; steam came from some, dust from others, all showing the use for which they were intended. Mr. Watson told me that "if the fans were stopped for a short time it was immediately noticed by the workmen," and since the adoption of this system the good effect upon the health of the operatives had been noticed.

In conclusion, looking at the important bearing that the efficient ventilation of factories has upon the health of the workers, it seems to me there should be some authority with power to compel the best-known means of ventilation to be carried out in what may be termed unhealthy trades, thereby lessening the danger to disease and lowering the mortality-rate among textile as well as other trades.

MEANS FOR PREVENTING THE SPREAD OF CONTAGIOUS DISEASES IN CITIES.

BY J. C. BAYLES, M.E.

A paper prepared at the request of the New Jersey State Sanitary Association, by Mr. J. C. BAYLES, President of the Health Department of New York.

GENTLEMEN—My experience in connection with the management and restriction of contagious diseases in cities being limited wholly to New York, the only information I am able to give you on the subject you have asked me to discuss has specific relation to the appliances and methods of the Health Department of New York city. As a prelude to this brief presentation of facts, I desire to remind you that, not being a physician, I shall avoid all questions upon which there is likely to exist a difference of medical opinion. In the sanitary administration of a city, economic as well as medical questions constantly arise, and with the former rather than the latter the executive head of such an administration has to deal. It has been remarked that in military operations success depends quite as much upon the efficiency of the Quartermaster's Department as upon the skill and experience of the commanding General. Food, military supplies and transportation are as necessary to the successful operations of an army in the field as its plan of campaign. In this paper I shall endeavor to show by what material agencies the best judgment of the medical profession, as to the handling and restriction of contagious diseases in New York city, is given practical application for the public good.

Before those responsible for the sanitary administration of a city can do anything to limit the spread of contagious diseases, they must be advised promptly when and where such diseases appear. For this information they are dependent upon the reports of physicians. Such reports are required by law, but until lately the observance of this law was largely voluntary. Many physicians neglected to report cases under their care, and in some instances refused. Perhaps a reason for

this was found in the fact that such reports from physicians were not always regarded as privileged communications. By one means or another the enterprising reporters got access to them, and, as the result, those which were supposed to possess any features of sensational news interest were investigated by the reporters, to the great annoyance of physicians and patients. As a first step in the direction of holding physicians to the responsibility imposed upon them by law, they were given positive assurances that such reports sent to the Health Department would be held sacredly confidential, and this promise has been kept so carefully that the objection which originally existed in the minds of physicians to reports of this kind have largely, if not wholly, disappeared. At the present time the unreported cases are known to be very few in number. The death returns are carefully watched, and afford an index to the work of the physicians in this respect. When cases of failure to report are investigated, it is usually found that conditions exist which excuse the physician. The disease may be masked by complications having marked and perhaps misleading symptoms, leaving the physician honestly in doubt as to what he is dealing with until it has taken definite shape, or a case may be so rapidly fatal that the physician has no opportunity to report it between the time he is first called in and the affixing of his signature to the death certificate. Some allowance must also be made for erroneous diagnosis on the part of physicians of limited skill and experience, and when a physician elects to defend a violation of the law by impeaching his own intelligence, up to a certain point his plea is unanswerable. I am happy to say, however, that there exists a feeling of confidence on the part of the medical profession of New York toward the Health Department which is productive of mutually pleasant and advantageous relations, and it is very seldom necessary to invoke the penalties of the law to compel reputable practitioners to comply with its requirements.

Having information as to the occurrence of cases of contagious disease, this information must be used promptly and discreetly. To facilitate such use, the city is divided into eleven districts, each of which has a Medical Inspector, whose duty it is to examine and report upon every case occurring within his district of which he has official information. These inspections are made as promptly as possible, as in matters of this kind a delay of even a few hours is dangerous. The District Medical Inspectors deal with every form of

contagious disease reported to the department, except small-pox, which requires a special service. For small-pox there are eight Medical Inspectors engaged exclusively in vaccination and in investigating reported cases. The staff of the Contagious Diseases Division also includes a Chief Medical Inspector, an Assistant Chief Inspector, two expert diagnosticians and two eminent pathologists, who are always available for consultation. Of what may be called the plant of this division I will speak later.

The method of procedure in dealing with cases of contagious disease in New York is, briefly, as follows: Reports of cases are received at the office of the Chief Medical Inspector, and are transmitted as promptly as possible to the District Inspectors. These gentlemen are at all times in telephonic communication with headquarters, and in going about their districts are instructed to call up the Chief Inspector's clerk for instructions, whenever they are able to do so. Telephones are so numerous that this entails no difficulty, druggists and physicians being always willing to give our officers the use of their instruments for this purpose. Instructions are also sent, in special cases, by telegraph, by the special telegraphic system of the Police Department, by mail when the lateness of the hour warrants this method of transmission, or by messenger. The Inspector thus notified goes as promptly as possible to the house indicated, to see that the case is properly taken care of from a sanitary standpoint. He inquires as to the physician in charge, the measures for isolation, and the instructions of the physician. He also inspects the premises carefully, from cellar to attic, to discover if there exist conditions which might be supposed to cause, aggravate or propagate the disease with which he is dealing. If the case is in the hands of a reputable physician, the Medical Inspector does not see the patient, nor in any way interfere with the physician's work or directions. If, however, he is in doubt as to the standing of the physician having the case in charge, or discovers evidence that the family have not been properly instructed and do not appreciate the necessity for careful isolation, or for any other reason deems it necessary to do so, he finds the physician in responsible charge and confers with him. From this point he must act according to his judgment. If he has reason to believe that the case is in good hands and will not be neglected, his duty is for the moment at an end. If he has doubts on this subject, he reports the case promptly to the Chief Medical Inspector, who then assumes

the responsibility and gives such directions as the facts call for. By this system the department is enabled to work in entire harmony with the medical profession. The Medical Inspector is required to observe the code of professional ethics in his official work as carefully as he would in private medical practice, and his failure to do so is followed by reprimand or dismissal.

In most cases the procedure above described concludes the work of the department. These include pretty much all cases of contagious disease other than typhus fever and small-pox occurring in private houses, in the families of persons of average intelligence, comfortable circumstances, and provided with medical attendance. In a great city, however, and especially in a city in which 1,079,728 people live in the 32,390 tenement and apartment-houses which distinguish it from other cities, it is necessary that the Health Department shall take more radical and far-reaching measures of public protection. A great many cases are found, on inspection, for which no regular medical practitioner is willing to assume any personal responsibility. He is called in, recognizes the disease, prescribes for it and reports it. The family may not be able to employ regular medical attendance, and are content with such medical advice as they get during one visit or from a single office consultation. In such cases no question of professional ethics arises, the physician, as the rule, being very glad to be relieved of any further responsibility after making his report. The Medical Inspector takes charge of the case and promptly reports it to the Chief Inspector as calling for special attention. If the case cannot be isolated, removal to the hospital is advised. Before removal, however, the patient is seen by the Chief Inspector, or by one of the diagnosticians of the department, as it is necessary that the judgment of the District Inspector as to the nature of the case and the desirability of removing it, should be revised by some one having larger official responsibility. Where the facts warrant it, the patient is removed to one or the other of the department hospitals. If removal is unnecessary, or can be avoided without danger to persons not already infected, the course of procedure is that which any experienced physician would employ if in charge of the case.

Supplementing the work of the district physicians we have a corps of disinfectors, who follow the Inspectors, distributing circulars of information and offering such disinfecting solutions as are immediately needed. The disinfecter also applies these disinfectants when neces-

sary, or instructs nurses and attendants in their use. He again visits the premises when the District Inspector reports that the disease has ceased to be contagious, and follows his instructions as to the measures which are necessary to "clean up" after the case, dispose of bedding and other infected articles, and leave the premises in safe condition. If the patient dies, it is required that the funeral shall be conducted in strict accordance with the requirements of the Sanitary Code. Undertakers are held to a strict accountability, and their work is so far supervised and watched by the officers of the Health Department that it is almost impossible for them to violate the law. As this is a matter of great importance, those for whom the subject has concern will be interested in reading the circular defining the duties of undertakers and surviving relatives, copies of which are given out with every burial permit for a case of contagious disease, and are also sent to the house by a police officer of the Sanitary Squad. It is as follows :

" NOTICE.

**" RULES GOVERNING PROCEDURE AFTER DEATHS FROM
CONTAGIOUS DISEASES.**

" The attention of those whom it may concern is hereby called to Section 204 of the Sanitary Code, as follows :

" There shall not be a public or church funeral of any person who has died of small-pox, diphtheria, scarlet fever, yellow fever, typhus fever or Asiatic cholera, but the funeral of such person shall be private; and it shall not be lawful to invite or permit at the funeral of any person who has died of any of the above diseases, or of any contagious or pestilential disease, or at any service connected therewith, any person whose attendance is not necessary, or to whom there is danger of contagion thereby.

" Undertakers are directed, for their own protection, to take notice of the requirements of Sections 148 and 210 of the Sanitary Code, as follows, to wit :

" " That no person shall, within this city, without a permit from this department, carry, remove, or cause or permit to be carried or removed, any person sick with small-pox or other contagious disease, or remove or cause to be removed any such person from any building or vessel to any other building or vessel, or to the shore, or to or from any vehicle in any part of the city. Nor shall any person, by any exposure of any individual sick of any contagious disease, or of the body of such person, or by any negligent act connected therewith, or in respect of the care or custody thereof, or by a needless exposure of

himself, cause or contribute to, or promote the spread of disease from any such person, or from any dead body.

“It shall be the duty of every undertaker having notice of the death of any person within the city of New York of small-pox, diphtheria, scarlet fever, yellow fever, typhus fever, Asiatic cholera, measles, or any other contagious disease dangerous to the general health of the community, or of the bringing of the dead body of any person who has died of any such disease into such city, to give immediate notice thereof to this department. And no undertaker shall retain or expose, or assist in the retention or exposure of the dead body of any such person except in a coffin or casket properly sealed; nor shall he allow any such body to be placed in any coffin or casket unless the same be immediately and permanently sealed. Nor shall he assist in the public or church funeral of any such person.’

“It will be understood that the permit for the burial of _____, issued under Section 151 of the Sanitary Code, is subject to the conditions imposed in Sections 148, 204 and 210, above quoted, and that it is a violation of duty on the part of the undertaker to assist in any needless exposure of the body of any person who has died of a contagious disease, or to contribute in any way to the spread of disease from any such body, or to conduct or assist in a public funeral of any such person.

“Information as to the proper treatment of a body after death from a contagious disease, and as to cleansing and disinfection of clothing and premises, will be furnished by this department on application to the Chief Inspector of the Division of Contagious Diseases.

“By order of the Board of Health.”

When necessary, the officers of the Health Department undertake the disinfection and purification of premises. This includes cleansing walls and floors and removing, for treatment, all fabrics or other articles likely to hold or carry contagion which have been exposed to it. The manufacture of ready-made clothing in tenement-houses is one of the great industries in New York, employing, probably, more persons than are engaged in any other single trade. This clothing is largely made up in the living and sleeping-rooms of the persons who take it home, and it is not unusual to find a pile of finished or partially-finished garments in a room in which one or more cases of contagious disease have been treated, and in which deaths have occurred. It is obviously the duty of the department to seize all this material and remove it for disinfection. We are as careful of the property thus taken as our duty permits us to be, but as a good deal of it is of a poor quality, cheaply dyed, it frequently happens that the fabrics are injured in the process of disinfection. We shall be better able to

avoid such injury in the future than in the past, but as the law empowers the officers of the department to seize and destroy all such articles when in their judgment it is necessary, no legal liability for injury during disinfection has ever been recognized by the courts.

The plant of the Contagious Diseases Division is of necessity large and costly, but a further liberal expenditure is needed to adapt it to the requirements of a great city like New York. For the transportation of patients we have coupés and ambulances. The coupé resembles, externally, a private carriage, but is so fitted up inside as to render frequent and thorough fumigation practicable. This carriage is used whenever it can be, and always in removing patients, not too sick, from parts of the city where the presence of an ambulance would attract attention or create alarm. If a patient is able to be removed in a carriage, this method is preferred, and it robs removal to a hospital of half its terrors if the journey thither is made comfortably, and even pleasurably for those to whom a carriage-ride is a novelty. In the case of the very sick, the ambulance is necessary. These vehicles are well built and equipped, and have all the conveniences required. When the city was menaced with cholera during the summer of 1887, they were reconstructed and put in a condition to safely handle this disease. The bottoms were made tight with sheet-iron casings, and racks were provided for vessels containing disinfecting solutions for instant use. The department also has wagons for the conveyance and distribution of disinfecting solutions, which are not much used at present.

Of hospitals the department has three. The Willard Parker Hospital, near the foot of East Sixteenth street, is at present devoted entirely to diphtheria and scarlet fever. These are treated in separate wards, are provided with separate corps of nurses, and communication between these wards is so carefully guarded that no complications arise, or are likely to arise, from the presence of the two diseases under one roof. Its management is constantly supervised by the Medical Commissioner and the Advisory Committee, including some of the most eminent physicians of New York. Near the Willard Parker Hospital, but far enough from it to permit complete separation, is the Reception Hospital, to which are sent all cases of typhus fever, small-pox and other contagious diseases for which provision cannot be made in the Willard Parker Hospital. It is largely a hospital of observation. Well-marked cases are not retained there, but are sent by the steamboat of the department to the larger hospitals on

the North Brother Island. The buildings and improvements on that island are a surprise and pleasure to all who see them. The surroundings are beautiful, the buildings capacious and well appointed, and the accommodations for patients comfortable and convenient. The system includes a large brick small-pox hospital, seven isolated pavilions where other diseases can be separated or small-pox patients received, if necessity exists, an administration building, a morgue, a disinfecting-house and other requisite structures. In a city like New York it is necessary to provide accommodations in excess of the average requirements of the service, as we are liable at any time to have outbreaks of disease which will tax the accommodations of the department.

The disinfecting plant in connection with the Willard Parker Hospital in East Sixteenth street, is not in all respects satisfactory, but is as good as we have thus far been able to provide. With the beginning of next year we shall undertake the construction of a much more ample disinfecting plant, supplemented by better transportation facilities. The new plant will include a large hot-room, with means for raising the temperature to 280° Fahr. We need this large room for the reason that a small chamber of any kind into which fabrics to be disinfected, have to be put folded, does not meet the requirements of the case. Last winter an interesting experiment was tried, which gave rather startling results. Into the hot chamber was put a blanket which had been exposed to the weather, and had frozen stiff, the ice caking in its folds. This blanket was folded so as to occupy convenient space, and was subjected for twenty-five minutes to a temperature of 260 degrees. At the end of this time it was taken out, and ice was still found in its folds; showing that very little dependence can be placed upon the penetration of heat into the interior of a folded woolen fabric. In the large hot-room to be provided, and for which an appropriation has been made, all such articles can be hung loosely on wires, and so exposed to a high temperature in every part. We shall also have more ample accommodations for disinfection with sulphurous acid, boiling disinfecting solutions, steam, &c. The new plant will include four wagons provided with a complete disinfecting outfit, and each wagon will carry two men who have had training and experience as disinfectors. For so large a city as New York, six wagons and twelve men are really needed, but for the present we hope to do good work with the means at our command.

During the nine months from January 1st to October 1st, 1888,

18,276 cases of contagious disease were visited and investigated, making an average of 1,828 for each Inspector. During this same time the Medical Inspectors made 17,490 sanitary inspections of premises, and 5,948 re-inspections. They forwarded 3,258 complaints of discovered nuisances calling for abatement, of which 3,073 were abated in consequence of their effort; the balance, 185, remained in the hands of the Inspectors for further work on their part.

I am happy to say that the Health Department of New York enjoys the confidence and co-operation of the medical profession, whose representative members are always glad to assist its work in any way in their power. At a meeting of the Academy of Medicine held last spring, a committee of conference with the Health Department was appointed at the request of the Commissioners, and this committee has always been prompt and faithful in the discharge of all duties committed to it. It confers with the Health Commissioners at their request, on all matters relative to the public health, showing especial activity on the several occasions during the past two years when the city has been menaced by contagious diseases received at Quarantine or prevailing as epidemics elsewhere in the country. In my judgment, the success of the work which the Health Department is now doing, results in a large degree from the care taken by the officers of the department to observe all rules of professional ethics in their contact with the medical profession, and the positive instructions of the Commissioners to the Medical Inspectors not to interfere with the work of a physician, unless such interference is necessary. Under these circumstances, the help of the department is welcomed by the profession, and the division of responsibility is so nicely adjusted that there exists no room for conflict between the private practitioner and the department. It must be remembered, however, that all practicing physicians cannot be entrusted with this kind of responsibility. For example, I recall an instance in which a physician in general practice, and not without experience, finding in his office a patient badly broken out with small-pox, who had called to consult him, took this patient to the hospital in an elevated railroad train, and did not seem to appreciate, until arrested and made defendant in court, that he had been guilty of an act which justified his prosecution. I am happy to say, however, that such instances are rare, and that experience in New York has shown that the sanitary administration of a city and its medical profession can work together in perfect harmony for the public good.

NEW JERSEY SANITARY ASSOCIATION.

Report, with Outline of Papers and Discussions, Session of 1888.

BY D. C. ENGLISH, M.D.

The fourteenth annual meeting of the New Jersey Sanitary Association was held in the Assembly Chamber, at the State House, Trenton, commencing Friday morning, December 7th, at eleven o'clock. The President, Henry Mitchell, M.D., of Asbury Park, in the chair.

After a brief report by the Secretary, Herbert B. Baldwin, analytical chemist, of Newark, read the first paper, on

WATER FILTRATION.

He spoke of the popular idea of filtering water to improve its physical appearance, while many are skeptical as to its material improvement, in so far as its injurious qualities are concerned. The pollution of water and of the various constituents that enter abnormally into its composition, was next considered. The water has its source in either surface streams and rivers, or in wells of greater or less depth. The ultimate source in either case is rain-water, and whatever impurities it contains are taken up at some period and between its existence in the state of vapor and the condition in which we obtain it. In case of rivers flowing through a thickly-settled country, the pollution is due more to the emptying in of the waste products of manufacture and sewage than to substances of mineral and vegetable origin. The former class of pollutions, termed artificial, are the most dangerous enemy of the sanitarian. Being in solution with a large volume of water, they leave no visible proof of their existence. The other class, called, in contradistinction, natural, consist largely of suspended matters of clay, vegetable fiber, plant life, &c.

In case of the artesian or deep wells, unless the removal of some

of the mineral constituents be the object in view, there is, generally, little need of filtration, and the shallow or surface wells, if so situated as to be at all liable to contamination, had better be abandoned, if possible, in favor of a different supply.

Mr. Baldwin then considered the requirements of the sanitarian in the construction of a filter, and the existence of micro-organisms in all natural waters, in some cases causing disease, and in other instances these germs seem to be harmless. While, therefore, it could not be said that the removal of every germ is essential to the purification of water for potable uses, it would no doubt be advisable to aim at an absolute extinction.

The paper then deals with the agencies at work to purify surface-water from foreign organic matter, viz., oxidation, precipitation, dilution and deposition, and suggests that we cannot do better than to imitate these processes as nearly as possible. Reference is made to the construction of some of our modern filters as practically carrying out this plan. The older systems of filtering-beds and settling-basins were referred to as having great practical value in reducing suspended flocculent matter and the percentage of soluble organic matter, and also the number of micro-organisms. The use of these in London, England, and in Poughkeepsie, N. Y., were detailed as illustrations, as were also the filter galleries and basins constructed in many places in Massachusetts.

Mr. Baldwin then considered those filters or systems wherein chemical and mechanical treatment of the water are combined, and believed the results already obtained demonstrated that we must look to some such method for the solution of the problem of water-filtration. A detailed description was given of this system as recently erected at Long Branch. The paper closed with a brief reference to house filters.

By request, Dr. E. M. Hunt, Secretary of the State Board of Health, opened the discussion of the paper. He spoke of the changes which take place not only by oxygenation, but nitrification, per micro-organisms, doing the work, but most of it within eighteen inches of the surface. As to germs as related to water, he thought we could not as yet go so far as to distinguish pathogenic germs, and therefore it is safer to get out as many as we can. Filtration will greatly reduce the number of microphytes, since their food is removed. He spoke of his personal experience with Trenton water; also of the change

effected at Long Branch from bad to satisfactory filtration. The experiments of the Massachusetts Board showed covered filter galleries better than open ones.

Prof. F. A. Wilber spoke of the use of alum in the purification of water, one grain to the gallon being effective, and did not believe it injurious in that proportion. He spoke of the change of material in filters, spongy iron, &c., and believed there is a great field for study and criticism.

Dr. F. Gauntt, of Burlington, had been much interested in the paper. Water had become a source of dread from the diseases arising therefrom. All suspicious water should be changed and sterilized by heat. Boil the water. This simple process is safe until we can get good water, and it is better than filters. He believed in alum precipitation; it may act as a germicide. Bakers, perhaps, use it for same purpose—to stop fermentation in yeast.

Dr. I. N. Quimby, of Jersey City, was interested in filtration—more interested in Nature's power to take care of these germs. The bacterial elements that are vegetable are good for correction of impurities which get into streams. The people should know that there are some germs which are not dangerous. He thought the most important thing to do was to call on the Legislature to stop the befoulment of streams; then let us take care of the sewage. Jersey City is struggling against schemers. No doctor there traced a single case of disease to the use of water; the hue and cry there is simply for financial aggrandizement.

Dr. W. K. Newton, of Paterson, thought it a remarkable statement that no case of disease in Jersey City could be traced to the water. "Maybe there is no physician in the place able to make the biological or other examinations." He complimented the paper as having been one of the ablest presented for a long time. It is an important fact that filters remove pollution when in large particles, and make water palatable. Such places as Rahway and Paterson must look on the subject from the engineer's, as well as the bacteriologist's standpoint.

G. W. Howell, C.E., of Morristown, had no practical experience, since he, as an engineer, had sought to introduce water that does not need filtering. Water falling on unpolluted soil is good and pure.

The discussion was continued by G. P. Olcott, C.E., and J. C. Pumpelly.

Mr. F. D. Budlong, of Hightstown, asked "Is well-water or filtered rain-water best?"

Dr. Gauntt believed that depended on the well and its surroundings. We must take into consideration all the surroundings.

Dr. Hunt said we should remember all water is rain-water. The South depends on rain-water. Parts of our State have to use it because of limestone. It is safe if properly collected and stored.

G. P. Olcott, C.E., related his experience of one cistern made better by a small filter between the cistern and the supply-pipe and branch of the outflow-pipe. For six years it has kept sweet. He spoke of the use of charcoal and sand. Brick filters are often useless. The inlet-pipe should go to the bottom of the cistern.

IMPURE MILK AS A CAUSE OF DISEASE.

The second paper read was by Daniel Strock, M.D., of Camden, on "Impure Milk as a Cause of Disease."

The Doctor commences his paper with remarks concerning the universal use of milk in some form and of the consequent interest of all in securing pure milk. The importance of scrutinizing the milk and the source from whence it is obtained is now being recognized by physicians, scientists and the press. While the healthy and robust sometimes partake of unwholesome or inferior milk with impunity, to the typhoid fever patient or others suffering with low forms of disease, or to the infant deprived of its natural food, the quality of the milk often decides the issue of the struggle for life.

The quality of milk required was then discussed, and also the irritant poison, termed tyrotoxicon, which sometimes develops in milk and is undoubtedly in many cases the cause of diarrhoea and cholera infantum, as well as of the poisoning sometimes caused by partaking freely of ice cream made from such milk. Dr. Newton's investigation of the seventy-three cases of poisoning at Long Branch, in 1886, was cited as conclusively demonstrating that tyrotoxicon was the poison present, and that improper management of the milk was the cause of its formation.

The transmission of the germs of typhoid fever, phthisis and other diseases by the milk from diseased animals or those that drink impure water, was then considered, and the importance of expelling all dairy cows from city limits, because from their unhealthy surroundings and

the quality of the food they receive it has been proven that they are a prolific source of pulmonary consumption, through their milk, which in some cases has been loaded with the bacilli of the disease. Scarlet fever and diphtheria have also been conveyed by milk. Mr. Ernest Hart's report to the International Medical Congress, 1881, is cited, in which he collected and tabulated fifty epidemics of typhoid fever, fifteen of scarlet fever and seven of diphtheria which were traced to milk. Milk contaminated with pus from an inflamed udder or an abscess on the udder has given rise to stomatitis in children, &c. Instances are cited by Dr. Strock of the epidemics of typhoid fever at Cologne, Germany, caused by milk from an infected dairy, and in Aberdeen, Scotland, in 1881, when 88 per cent. of the families using the milk from a certain supply were attacked. Also the epidemics of diphtheria in York and Camberly, England, in 1887, and the epidemic of diphtheria in Melrose and Malden, Mass., 1886, the direct and immediate outcome of an infected milk-supply, out of 16 foci of infection 13 having received the impure milk.

The writer points out the danger, during the winter season, of obtaining the water-supply for cattle from wells that are in close proximity to the barn and which receive a variable amount of liquid manure either directly, as after heavy rains, or by percolation through the soil, and asks, is it not possible that the barnyard wells hold a causative relation to many cases of typhoid through the medium of the milk? And may we not have here a partial explanation of the well-known tendency of this fever to prevail more extensively in the winter months? Owners of cows should be impressed with the danger incurred by allowing their stock to drink of impure water, not only from the possibility of contaminating the milk, but also of the risk of pecuniary loss by the cattle themselves becoming diseased. The duty of the physician and of the press was impressed. Fresh air, sunlight, pure water, nutritious food and exercise are as essential to keep a cow in good health as they are for the owner. Every dairyman and retailer should know the quality of the milk he sells, whether it is up to the State's standard (spec. grav. 1.029 and 12 per cent. of solids), but this does not demonstrate whether the cow that gives the milk of this quality is diseased or healthy. We can never be sure of our milk-supply until we have inspectors of dairy cattle, who shall examine all cows in the State at least once every three months, with authority and power to destroy or isolate any unhealthy

animals and prohibit their milk being used; also to examine their surroundings, food, water-supply, &c. The Doctor insists that it is the duty of the State to protect the people against contaminated as well as adulterated milk. Legislation bearing upon the milk question should be directed not only against the original handlers of the article—the dairymen and wholesale dealers—but attention should also be given to the retailers as to how and where they keep the milk. The Local Health Boards should have authority to inspect the premises of retailers of milk.

The discussion of Dr. Strock's paper was opened by Shippen Wallace, Ph.D., of Burlington, who spoke of the importance of the subject. He spoke of typhoid fever cases in New York city, Long Branch and Philadelphia which had been traced to the milk-supply.

Dr. Parmley, of Oceanic, thought that milk when just to the point of fermentation is more dangerous than when it has actually fermented, for going into the stomach the process is carried on.

Dr. E. M. Hunt thought it practicable to inspect city dairies. In cities cattle should be registered and the milk-supply be inspected. He cited many cases in which the condition of cattle was outrageous. Boards of Health should have the legislation suggested, and close, systematic inspection should be made, and the people, especially in our cities, taught its importance.

Dr. W. K. Newton spoke of milk as an excellent culture medium. It does absorb germs. Scarlet fever has been conveyed by it, we know. The cow itself may have had scarlet fever, not probably due to exhalations but to water containing germs. Ptomain poisoning is well known from milk; as to tuberculosis our knowledge is yet unsatisfactory, but bacilli have been found in milk. He believed in inspection or supervision of sale of milk in our cities, but it was impossible for State officers to do this. Local Boards should inspect all stables. The city of Paterson has very much reduced the number of cattle in the city limits. We should have an intelligent public sentiment in these matters. The Legislature should give us some power in the matter of feeding of cattle. The danger from brewers' grain was referred to.

Upon motion of Dr. Newton, Dr. E. S. McClellan, of Paterson, was given permission to exhibit the working of his patent trap, in the

ante-room, at the close of the morning session. A large number of the members availed themselves of the opportunity, and were much pleased, not only with the admirable manner in which its working was shown, but also with the apparent excellence of the device.

REPORT OF DELEGATES TO THE FOOD CONVENTION.

Dr. Newton presented the report of the delegates to the Washington, D. C., Food Convention, as follows :

“The movement, having for its object the protection of the food-supply of this country from adulteration, had its origin with the National Board of Trade. That Board, at its annual meeting, 1879, adopted resolutions authorizing the appointment of a committee to investigate the matter, to report on the necessary means for checking the evil of adulteration, and also to present a draft of a bill to be presented to the National and State Legislatures, to be by them enacted in legal form. A prize of \$1,000 was offered for the best report on the subject and for a model of a law. The committee of the National Board of Trade was composed of the following eminent men: Dr. John S. Billings, Prof. Charles F. Chandler, ex-Chancellor Williamson, and Messrs. Hardy and Gano. They reported, in 1880, a draft of a law that was subsequently enacted in the States of New Jersey, New York, Massachusetts and Michigan. After years of trial it was ascertained that the State legislation alone was not able to cope with the evil of adulteration, as the laws were, of necessity, only in force inside the States making them, hence did not affect importations, articles transported from one State to another, or articles manufactured or sold in States having no law. To try and remedy this defect, and to urge on other States the passage of proper laws, a meeting called a Pure Food Convention was held at Washington in 1887.

“After considerable discussion this convention adjourned after appointing a committee to report during the next year. This committee was to draw up a bill to be submitted to Congress, and also to call another convention. The committee prepared a law after the plan of those in force in the States and urged influential members of Congress to have it enacted, and the work was so well done that it is probable that the bill would have passed had the convention never met.

“According to instructions, this committee called a convention, to be held in January, at Washington, and it saw fit to invite thereto delegates from grocers' associations, trade journals, representatives of manufacturers and others. Corporations engaged in the manufacture of bogus articles of food were also invited. Thus the convention was largely composed of persons ignorant of the objects of the meeting, or actually engaged in the very practices to which the meeting

was supposed to be opposed. The mistakes of the Committee on Credentials also added to the lack of harmony, as it admitted any person, no matter whence he came or what his claims.

"After the organization of the meeting, in the course of which one of your delegates was elected President, the proposed bill was taken up, section by section, and discussed very thoroughly and exhaustively. Nearly every section had an opponent on the floor. As a consequence, discussion was very prolonged and acrimonious. When the discussion had concluded, the original draft of the proposed law was not to be recognized in the one adopted by the convention.

"At one time your delegates threatened to withdraw from the hall, on the ground that the objects of the convention, as stated in the call, were now thoroughly perverted, and also that the action of the delegates was at variance with the professed purpose of the convention as stated in its title.

"We may briefly sum up by saying that the so-called Pure Food Convention was a failure, and that the action there taken has been the means of postponing national legislation in the interests of pure food for years. The real advocates and influential men who have worked for years in the hope of obtaining recognition from Congress, are no longer connected with this spurious movement, and the convention has been converted into a National Grocers' Association.

(Signed)

"WM. K. NEWTON,
"SHIPPEN WALLACE,
"Delegates."

AFTERNOON SESSION.

Discussion was had on the report of delegates to the Food Convention.

Dr. E. M. Hunt spoke of the importance of a clear discernment between the health and commercial parts of this question. We must be on the alert, and throw our influence on the right side. The question of securing pure, wholesome food was one of pressing importance.

Prof. J. Madison Watson, of Elizabeth, said he had not anticipated the character of this report. He felt there should be some action taken on this matter by our Association.

Dr. Shippen Wallace gave an account of some of the workings of the convention, especially as to the officers and control of the convention. He thought the convention should be designated the "Pure Fraud Convention," as practically, the effect was to protect the retailer in the sale of adulterated goods.

On motion of Prof. Watson, the report was referred to the Executive Council for their action.

Dr. W. K. Newton was then introduced and read a paper on "Ice as a Source of Disease."

(The paper will be found on page 119 of this Board of Health Report.)

The discussion of this paper was opened by Dr. David Warman, of Trenton. He spoke of the subject as one of great importance, in which we are all interested, and of ice itself in intemperate quantities, as deleterious to health, and quoted from an article of his own, showing that ice-water is injurious to the people, especially in hot weather. He then referred to several instances in which disease had been caused through the use of impure ice. He believed that the Trenton ice was good, having been taken, mostly, from the Delaware river.

Dr. F. Gauntt spoke of his living not very far from the city of Philadelphia, where they had more deaths from typhoid fever than any other city in the world. Its water-supply was from the Schuylkill river, and was badly contaminated. Last winter a large ice crop was secured from that river, and this summer many more cases than usual of the fever prevailed. He believed the ice was partly the cause of its prevalence. Camden is now having an epidemic of typhoid, and he thought ice has done much to increase the trouble this year.

Mr. J. C. Pumpelly, of Morristown, spoke of the Morristown ice-supply as coming largely from a pond near the city, in a hollow. He thought the purity of their ice was open to suspicion, and that the Local Board there, as elsewhere, should investigate.

Prof. Watson thought this subject worthy of consideration and action. We can do efficient service in preventing the use of impure ice. Water can be cooled without the direct use of ice; put ice around it and not in it.

Dr. W. K. Newton spoke of the danger of using impure ice, and of the necessity of taking action before people were killed by it. Also of the preserving power of ice against putrefaction. The typhoid bacillus we know is preserved. The danger often arises by contact in refrigerators. He urged when there was any doubt as to the purity of ice, that families get cool water by putting water in thin glass bottles in the refrigerator, as suggested by Dr. Mitchell.

The subject was further discussed by Drs. Alexander Wilder and Quimby and Counselor Harvey.

DISPOSAL OF GARBAGE.

Jacob S. Wetmore, Esq., of Englewood, presented a full report of the action of the committee, of which he was chairman, appointed at the last year's meeting to wait upon the authorities of New York city and endeavor to have the disposal of their garbage so changed as that it should not be washed up on the banks of the Hudson river and along our coasts, thus creating serious nuisances.

The report showed that the committee had acted with commendable judgment and energy; that they had been very courteously received, and that the nuisances had been almost entirely abated. Complaint had, however, been made recently that at one or two points the trouble was again threatening, and therefore, on motion, the committee were thanked for their efficient work and continued during the ensuing year.

Dr. E. M. Hunt spoke of the work of this committee as demonstrating that when in the right, perseverance can accomplish what is wanted.

Dr. Henry Mitchell spoke of the suffering from this nuisance at Asbury Park; the material proved where it comes from, and he was anxious for its abatement and favored continuing the committee.

After this report Dr. E. M. Hunt referred to the McClellan trap, which had been exhibited during the recess, as worthy of examination.

He also spoke of the need of more knowledge of practical plumbing, and also of the need of proper legislation. The only general power needed by the State Board is to attack nuisances where the Local Board fails to do its duty, not by their own act, but by a bill of complaint before the Chancellor.

INSTRUCTION OF SANITARY INSPECTORS.

Dr. W. K. Newton, chairman of the committee appointed last year to consider and recommend some plan for the instruction of Sanitary Inspectors, &c., reported as follows:

“Before entering into the discussion of the main points of the subject, it would be well to bring into review the requirements for sani-

tary administration as set forth in the amended Public Health law of 1887. That act requires that every city, borough, town and other local municipal government shall have a Board."

After reference to the provisions of the State law as to Inspectors, the report proceeded to outline what should be regarded as adequate preparation. The report says:

"In drawing this up, we have ignored the fact that many, if not most health officers in our State are physicians, hence have studied, in their medical course, many of the subjects required, but the items are put in to complete the discussion. If in cities the duties of medical officer of health are separate from those of Inspector of Nuisances, then it is not requisite that the latter shall be conversant with those of the former.

"Before going further, we shall pause and ask the question: If the proposed course of study is required of all candidates for sanitary offices, where, in this State, shall such instruction be obtained? In reply, we may state that it is not at all improbable that one of our State institutions may be induced to provide lectures on at least a portion of the course, while the State Board of Health may give instruction in the remaining branches.

"Further, all reference to purely personal hygiene has been omitted, because that has little to do with the official duties of the Inspector, and the text-books in this department are many and admirable.

"COURSE OF STUDY IN SANITARY SCIENCE.

"*I. Public Health—Sanitary Science.*—Their objects and aims. Definition of terms. Outline of claims and practice. Difference between public and private hygiene. Preventable diseases. The divisions of the subject.

"*II. Sanitary Administration.*—State laws relating to the public health. Organization of the State Board of Health. The powers and duties of the same. Organization of Local Boards of Health. Powers and duties—(1) as to nuisances; (2) as to adulterated food; (3) as to epidemic diseases; (4) quarantine and isolation; (5) animals; (6) registration; (7) inspection of houses, jails, &c.; (8) plumbing; (9) water-supply; (10) burials. Powers and rights of Board. Rights of the citizen.

"*III. The Air.*—Composition. Attributes of ingredients. Temperature. Influence on health. Air pressure. Moisture. Climate. Analysis of air, chemical and microscopic. Pollution of air by gases of decay, by effluvia of factories.

“IV. The Soil.—Attributes. Composition. Porosity. Moisture. Temperature. Ground-air. Ground-water. Influence of pollution.

“V. Water.—Chemical and physical properties. Source. Kinds and characters. Requirements of potable water. Mineral and organic ingredients. Rivers, pollution. Wells, pollution. Cisterns, pollution, causes, characters, effects, prevention. Ice pollution. Lead-poisoning. Sanitary analysis. Microscopic examination.

“VI. Food.—Adulteration, and its prevention.

“VII. Habitations.—Site, construction, material, ventilation, heating, lighting. Disposal of waste. Plumbing. Tenements.

“VIII. Restriction of Disease.—The germ theory. Zymotic diseases. Contagious and infectious diseases. Methods of restricting disease. Vaccination. Disinfection.

“IX. Vital Statistics.—Laws relating to. Births. Marriages. Deaths. Classification, tabulation. Calculations of rates.

“X. Tabulation of Inspections.—Inspections of houses, wards, streets, &c.

“In conclusion, we would state that only the briefest outlines are given, but enough has been written to show the subjects that the sanitary officers should be conversant with.

“We hope that steps will be taken by the Association to induce one of the State institutions to provide a course of instruction, and that the question of requiring a certificate in sanitary science, as a prerequisite for all applicants for positions under our health laws, will be discussed.

“Respectfully submitted,

“WM. K. NEWTON,

“HENRY MITCHELL,

“Committee.”

Prof. J. M. Green spoke of the importance of having educated Inspectors, but how could we secure them for the amount of salaries usually paid?

Dr. Quimby said in Jersey City \$1,200 per annum is paid.

Dr. Hunt referred to the plan suggested and of the necessity of looking to the future, but we must remember that it takes time. England took forty years to reach this. We should certainly expect that in a few years we can secure Inspectors properly educated. Certainly all large cities must have intelligent Inspectors.

Prof. Watson was delighted with the report; it was timely. He

hoped it would soon be required in small rural places. He thought Inspectors should be paid as much as public teachers.

Dr. Mitchell thought our State should take the initiative in this matter, and that others would be sure to follow. The carrying out of the plan suggested in the report would certainly accomplish great good.

After further discussion, the report was approved and referred to the Executive Council, to take such action as they may deem expedient.

EVENING SESSION.

President Henry Mitchell, M.D., delivered the annual address, on "The Sanitary Necessity for the Control of the Construction of Dwellings."

(See page 55 of this report for Dr. Mitchell's address.)

The thanks of the Association were voted to Dr. Mitchell for his able address, with the request that he furnish a copy for publication.

THE HYGIENIC ARRANGEMENT OF SCHOOL TASKS.

Prof. W. B. Ireland, of Asbury Park, was then introduced and read a paper on "The Hygienic Arrangement of School Tasks."

After some preliminary remarks he considered the question as to the age at which children should begin to attend school. He did not believe in fixing it at five years of age, as is done in our present school laws, placing our little ones at that tender age upon hard benches with straight, unyielding backs, there to sit with their little feet dangling six inches from the floor for five or six hours. He thought seven years should be the lowest limit. That if we could by some occult process look into the little busy brain of a child between the ages of three and seven, and see the tremendous lessons he is learning each day, we would hesitate before attempting to cram book lore into the already too active and overcrowded brain. He hoped that New Jersey would follow the wise example of some of her much younger sister States in the West. Yet, while waiting, he would urge that as far as possible, we model the work of younger classes according to kindergarten methods. We should have *no*

"*tasks*" for children under seven. Then he suggested that it would be well could the mental and physical development of the child be considered in arranging the tasks. He believed in the reduction of books if not of studies. Too many people gauge the progress of adolescents by the number of books they lug daily to and from school, failing to distinguish between the teaching of ideas and the teaching, so-called, of books.

He referred to Prof. Johnson's maxim, "Every increment of food presupposes a corresponding increment of growth, and every increment of exercise, a corresponding increment of strength," and applied them to both physical and mental development, dwelling at some length on the importance of properly adjusting the mental and physical training of children. He was glad to see the indications that the leading educators are beginning to realize that we have been teaching *books* rather than *ideas*, and live, progressive teachers are earnestly seeking to repair the mischief. Prof. Ireland next dwelt upon the results growing out of the luncheon recess, which lasted usually about one hour, drawing a picture of the child hurrying home, eating, or rather, bolting his food, hurrying back again, to apply himself to some severe mental task. He suggested that younger pupils, say from seven to ten years old, should have half-day sessions, from 9 to 12 o'clock, and older pupils who can endure two sessions, and who live remote from the school, should bring luncheon and partake of the same in a room set apart for that purpose.

He spoke of the dangers to health from scholars wearing rubber boots and overshoes and keeping them on all through the school sessions; also of the lack of ventilation in many school buildings and school-rooms.

In closing, he made the following propositions:

1st. The heavier studies, requiring the exercise of judgment, calculation, &c., namely, mathematics, down to the lowest grades of number work, certain of the natural sciences, as physics, chemistry, &c., should have their place in the morning hours, when the pupil, having been refreshed by a night of rest and sleep, is better able to combat with these more difficult studies. Such memory-studies as history, and the semi-mechanical, as writing and drawing, may be left to the later hours of the day.

2d. Exercises should be so varied or alternated that a constant strain should not be brought to bear on one single faculty, *e. g. a*

recitation requiring an exercise of the reasoning powers, as mathematics, should be followed by one bringing in play only the memory. An exercise straining the eye and cramping the chest, as writing too often does, might be followed by a purely oral recitation, &c.

The discussion of Prof. Ireland's paper was opened by Hon. E. O. Chapman, of Trenton. He thought the subject was very broad and important. If the school tasks be not distributed according to the laws of health, great mischief will be done. He thought we should give up the word "tasks" in connection with the school-life of childhood. It is the growing-time—mentally, it may be, physically, it certainly should be. It should be a pleasure for the young child to attend school. All school training should be pleasurable, not arresting development in any direction. We should not forget the necessity for the development of the physique, while we strive to develop the intellectual faculties. He esteemed it a very encouraging fact that a time is set apart for the discussion of these points in the annual meeting of our Sanitary Association. We should do away with the idea that schools are only to make scholars, but to make true men and women in every sense of the word. While agreeing with Prof. Ireland in the main, he did not believe in changing the law which fixed the school age at five years. The inquiring mind at five years should be trained; he feared that at seven years faulty habits would be formed which would be hard to eradicate. Let us not, however, put on them "tasks," place them on hard, uncomfortable benches, and give them difficult books, but fit the school-room duties so as to make the work easy and pleasant. He would not put books into the hands of young children in the school-room, so as to make it irksome and difficult. Books are indispensable, but they have been so much improved that many teachers depend upon them too much. Teachers recognize the difficulties and are trying to secure less book knowledge and more development. What can we as sanitarians do in the premises? The parents too generally are ignorant of hygienic requirements, insisting that their children shall carry back and forth to school a pile of books and undertake too many studies. The members of this Association can help to instruct parents and the public, and point out the danger of error in sanitary law.

Prof. J. M. Watson said he believed that the period when training should begin was at the birth of the child, but the great difficulty is

that in our large cities, and in many other places, parents are not fitted for training their children; they needed instruction. All books placed in the hands of children should be pleasurable, imposing no tasks. He illustrated how, in mental training, we use comparisons which the child is so apt to understand. All books for young children should be made to please them, and if we have not such books, we ought to have them. He would not keep the young child on a single lesson for any length of time, but give him change, and frequent change. Idleness is not true rest, but change of thought and occupation. He would emphasize that no child or man can ever be developed by mere mental or by mere physical training, but by mental with physical. Train all the faculties symmetrically.

SECOND MORNING SESSION.

The meeting was called to order by President Mitchell, at 9:30 o'clock.

Prof. F. A. Wilber, of New Brunswick, was introduced and read a paper on "Water-Supply from Wells in Relation to Health."

The Professor presented and explained several diagrams showing the various ways in which the water in wells had been contaminated, several of them representing wells in various places that had been examined and condemned.

Dowling Benjamin, M.D., of Camden, briefly opened the discussion on the paper, saying that it was a clear and correct presentation of the question, and that it was so plainly put that it would be a most excellent paper for distribution among the people.

Mr. Pumpelly asked Professor Wilber if he would not condemn every well in a town with a closely-settled population.

Prof. Wilber replied that he would have to know all the conditions before he could intelligently answer in the case of any town. He thought we ought to be careful of condemning any well before careful examination was had of the water and the surroundings of the well. We should make no statements concerning the positive impurity of any water which we are unable to prove.

Dr. T. W. Harvey, of Orange, spoke of the process of nitrification, and argued that downward filtration will, in time, affect the soil.

Dr. E. M. Hunt believed we should know all the conditions affecting our water-supply from wells. The Gilbert experiments were stated by Prof. Wilber pretty strongly. Certain soils do cleanse very rapidly. He thought it was mainly a question of strata. He felt the subject of great importance and very opportune, as wells are greatly injuring our people.

E. G. Harrison, C.E., of Asbury Park, related instances where oil passed through a clay soil and polluted a well.

COMPARATIVE VALUE OF TESTS FOR DEFECTIVE PLUMBING.

The next subject considered was "Comparative Value of Tests for Defective Plumbing."

In the absence of J. C. Collins, Esq., of New York city, President J. C. Bayles, of the New York City Board of Health, who had been requested to take his place, was introduced and spoke at some length on the subject. He dwelt on the necessity of thorough inspection of plumbing-work and of the success some dishonest plumbers had had in covering up bad work, which made it necessary to employ mechanical and automatic tests. They found a large proportion of the pipes themselves defective, having more or less cracks and minute holes. He said that it was not until within a few weeks they had been able to buy tested pipes. One of the tricks had been to cover the little pin-holes or cracks with moistened bread and cover it over with tar. The first step was to forbid the use of tarred pipes. This worked well. Then it was deemed necessary to have mechanical tests made by the plumber before the Inspector. The matter was brought before the Plumbers' Association, and they finally agreed to a test of 5 pounds to the square inch.

The methods of testing suggested by him were—(1) by ether, which proved too delicate; (2) by hydrogen, which was good, but inconvenient, and the odor may mislead; (3) smoke, which promised well—a machine was invented in the West for forcing smoke into pipes, but it does not give enough pressure; (4) air or water—they are equally good, about one-half are tested by each. Air is best applied by a gas-fitter's pump; the air whistles when there is a hole and a current. Sometimes a coating of soap is put over the pipe, and the bubbles forming over the cracks or holes tell the tale when the air is forced in the pipes. Water is probably best for all purposes. (See page 50.)

The air test must be 10 pounds. Some recent work has been subjected to 27 pounds. In the new *Times* Building, New York city, a vertical pipe of 200 feet gave no leakage. Houses are tested, as a whole, on this system. All buildings will hereafter be tested. The plumbers used to suffer many inconveniences by bad pipe. Now, companies are compelled to test pipe. The result is, that the best men must do the iron-work. The plumbers of New York now buy nothing but tested pipe; the untested pipes go mostly to New Jersey.

In reply to a question by Dr. Hunt, Mr. Bayles said that any pressure of water on good pipes will not be injurious, but it is true that if there are great leaks, its use in furnished houses would not do.

The subject was further discussed by Prof. C. McMillan, of Princeton; J. S. Wetmore, Esq., of Englewood; Dr. Benjamin, of Camden; Dr. Hunt, of Trenton, and Dr. Henry Mitchell, of Asbury Park.

PREVENTION OF THE SPREAD OF CONTAGIOUS DISEASES.

President J. C. Bayles then delivered an able address on "Means for Preventing the Spread of Contagious Diseases in Cities." He gave a detailed statement of the workings of the New York City Board of Health in this direction showing the thorough system and practical results there obtained.

(See page 179 of this report for Mr. Bayles' address.)

Dr. E. M. Hunt spoke of the amount of work performed by and the success attending the administration of the New York City Health Board as remarkable, and of the satisfaction it afforded us as an Association, of having one of our own members and a former President of this Association, at the head of the Health Board that was accomplishing so much good in New York.

Dr. Benjamin spoke of the clear and practical presentation of the work done, and believed it was a model for Boards of Health. He moved the thanks of the Association be tendered to President Bayles for this exceedingly instructive address, and that a copy be requested for publication. Which motion was unanimously adopted.

The Secretary reported from the Executive Council the following nominations of officers for the ensuing year, who were unanimously elected :

President, Dowling Benjamin, M.D., of Camden.

First Vice-President, George P. Olcott, C.E., of Orange.

Second Vice-President, Jacob S. Wetmore, Esq., of Englewood.

Recording Secretary, David C. English, M.D., of New Brunswick.

Corresponding Secretary, Prof. J. Madison Watson, of Elizabeth.

Treasurer, George W. Howell, C.E., of Morristown.

EXECUTIVE COUNCIL.

(With above-named officers.)

J. C. Pumpelly, of Morristown, Chairman.

William Elmer, M.D., Bridgeton.

Hon. E. O. Chapman, Trenton.

William Pierson, M.D., Orange.

E. S. Atwater, Counselor-at-Law, Elizabeth.

Prof. W. B. Ireland, Asbury Park.

C. Phillips Bassett, C.E., Newark.

Shippen Wallace, Ph.D., Burlington.

A. Clark Hunt, M.D., Metuchen.

E. L. B. Godfrey, M.D., Camden.

Prof. Chas. McMillan, C.E., Princeton.

Rev. Dr. A. E. Ballard, Ocean Grove.

T. R. Chambers, M.D., Orange.

Prof. F. A. Wilber, New Brunswick.

E. G. Harrison, C.E., Asbury Park.

A. P. Hunt, M.D., Somerville.

Herbert B. Baldwin, Newark.

The President appointed as the Committee on Legislation :

E. S. Atwater, Counselor-at-Law, of Elizabeth, Chairman; L. B. Ward, C.E., of Jersey City; E. M. Hunt, M.D., and Hon. E. O. Chapman, of Trenton; G. D. Saltonstall, M.D., of Hoboken; J. S. Wetmore, Esq., of Englewood, and Rev. Dr. A. E. Ballard, of Ocean Grove.

Dr. F. Gauntt offered a resolution recommending the establishment of a Biological Laboratory by the General Government. It was adopted.

After the transaction of some other items of business the fourteenth annual meeting adjourned. The general feeling of the members present was that this had been the most interesting and profitable of the entire series of meetings, and that the outlook for the future in matters of sanitation was brighter than ever before.

MEMBERS OF THE ASSOCIATION.

The following are the names now on the roll of the Association :

ASBURY PARK.

David Harvey, Jr., Attorney,
Prof. W. B. Ireland,
Isaac C. Kennedy, C.E.,
Dr. Henry Mitchell,
W. D. Pennypacker,
Randolph Ross,
Dr. J. H. Shotwell,
Uriah White.

ATLANTIC CITY.

Lewis Reed, Jr.

BAYONNE.

F. N. Barrett.

BELLEVILLE.

Dr. D. M. Skinner.

BLACKWOODTOWN.

Rev. F. R. Brace.

BLOOMFIELD.

Dr. Joseph A. Davis.

BOONTON.

Dr. J. G. Ryerson.

BOUND BROOK.

Lewis D. Cook.

BORDENTOWN.

Dr. W. H. Shipps.

BRIDGETON.

Dr. William Elmer.

BURLINGTON.

Dr. Franklin Gauntt,
F. W. Millner,
Nehemiah Sleeper,
Shippen Wallace, Ph.D.

CAMDEN.

Dr. Dowling Benjamin,
Hon. H. L. Bonsall,
Louis T. Derosse,
Dr. E. L. B. Godfrey,
Dr. E. M. Howard,

Dr. W. H. Iszard,
C. Henry Kain,
E. Read, Jr.,
Daniel Strock, M.D.

CAPE MAY CITY.

Dr. Henry A. Kennedy,
Dr. James Mecray.

DEMAREST.

William E. Davies.

DOVER.

Dr. T. R. Crittenden.

ELIZABETH.

E. S. Atwater, Counselor-at-Law,
Dr. G. W. Bailey,
Samuel Bonnell,
Prof. J. Aug. Dix, Superintendent,
Rev. Otis A. Glazebrook,
Rev. Carter H. Jones,
R. V. Lindabury,
Dr. W. A. M. Mack,
Dr. E. K. Morton,
Dr. E. R. O'Reilly,
A. R. Reeve,
Dr. Thomas Terrill, Jr.,
Prof. J. Madison Watson,
Dr. Robert Westcott,
Dr. N. L. Wilson,
James C. Woodruff.

ENGLEWOOD.

Henry Jones,
Jacob S. Wetmore.

FARMINGDALE.

Dr. S. M. Disbrow,
A. A. Yard.

FORT LEE.

Dr. Alex. Clendenin.

FREEHOLD.

Dr. D. McL. Forman,
Rev. Samuel Lockwood, Ph.D.,
Dr. I. S. Long.

GLASSBORO.

Dr. J. Iszard.

GLOUCESTER CITY.

J. A. Warnsley, M.D.

GOSHEN.

V. O. Miller.

HACKENSACK.

Dr. A. S. Burdett,
Wm. Williams, C.E.

HIGHTSTOWN.

F. D. Budlong,
Dr. Lloyd Wilbur.

HOBOKEN.

Charles B. Brush, C.E.,
Prof. A. R. Leeds, Ph.D.,
Thomas H. McCann, C.E.,
Dr. Louis Mitchell,
Dr. G. D. Saltonstall.

HOLLY BEACH.

M. L. Harrison.

HOPEWELL.

John Fleming.

IMLAYSTOWN.

Dr. H. G. Norton.

JERSEY CITY.

Dr. A. G. Avery,
E. W. Harrison, C.E.,
Dr. J. W. Hunt,
John Kase, Jr.,
Hon. John A. McGrath,
Hon. E. T. McLoughlin,
Dr. Wm. H. Newell,
Dr. I. N. Quimby,
Lebbeus B. Ward, C.E.,
Conrad Wienges, M.D.

KEY EAST.

E. G. Harrison, C.E.

KEYPORT.

Dr. J. C. Arrowsmith.

LAMBERTVILLE.

Amos Smith.

LEBANON.

Supt. O. H. Hoffman.

LONG BRANCH.

R. J. Andrews,
Prof. Wright Eckersly,
Prof. James M. Green,
Dr. S. H. Hunt.

MATAWAN.

Dr. S. J. Bartlett.

METUCHEN.

Dr. C. H. Andrus,
Dr. A. Clark Hunt.

MIDDLETOWN.

E. A. Osborn, C.E.

MONTCLAIR.

Samuel Crump,
E. J. Huestis,
C. H. Johnson,
Dr. John J. H. Love,
James Owen, C.E.,
Dr. J. W. Pinkham.

UPPER MONTCLAIR.

Dr. Morgan W. Ayres.

MORRISTOWN.

George W. Howell, C.E.,
Josiah C. Pumpelly.

NEWARK.

Dr. H. J. Anderson,
Herbert B. Baldwin, Chemist,
Prof. H. W. Barringer,
C. Phillips Bassett, C.E.,
Dr. Laban Dennis,
Hon. Joseph E. Haynes,
Dr. P. V. P. Hewlett,
Dr. C. F. J. Lehlbach,
Dr. F. B. Mandeville,
Wm. O. McDowell,
Dr. E. P. Nichols,
Dr. J. D. Osborne,
Dr. D. L. Wallace,
Dr. Alex. Wilder,
Durand Woodman, Ph.D.,
Dr. Charles Young.

NEW BRUNSWICK.

Prof. P. T. Austen, Ph.D.,
Dr. Henry R. Baldwin,
Prof. Geo. H. Cook, Ph.D.,
Dr. F. M. Donohue,
Dr. D. C. English,

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Merrill E. Gates, LL.D.,
Prof. Charles Jacobus,
McRee Swift, C.E.,
Dr. Charles H. Voorhees,
Prof. F. A. Wilber,
Dr. Nich. Williamson.

NEW DURHAM.

Abram W. Duryea,
Edward Lennon,
Charles Pinnell.

OCEANIC.

E. Parmly.

OCEAN GROVE.

Dr. J. H. Alday,
Rev. Dr. A. E. Ballard.

OCEANPORT.

Dr. E. W. Crater.

ORANGE.

James C. Bayles, M.E.,
Dr. Thomas W. Harvey,
George P. Olcott, C.E.,
Wm. Pierson, M.D.,
Dr. G. W. Richards,
Dr. J. Y. Simpson,
Dr. Stephen Wickes.

EAST ORANGE.

Dr. T. R. Chambers,
J. G. Thorp,
Philemon Woodruff.

SOUTH ORANGE.

Daniel T. Clark,
Dr. A. A. Ransom.

PASSAIC.

John B. Pudney,
F. H. Rice, M.D.

PATERSON.

John T. Hilton, C.E.,
Dr. W. S. Hurd,
Dr. John L. Leal,
Dr. Elias J. Marsh,
Dr. E. S. McLellan,
Prof. C. E. Mellany,
Dr. William K. Newton,
Dr. James W. Smith,
Dr. A. R. Wolfe.

PENNINGTON.

Dr. E. L. Welling.

PERTH AMBOY.

Hon. William Paterson.

PLAINFIELD.

Dr. W. C. Boone,
Dr. C. M. Field,
Dr. Joseph R. Platt.

PRINCETON.

Prof. C. F. Brackett, LL.D.,
Prof. H. B. Cornwall,
Prof. William Libbey, Jr.,
Prof. Charles McMillan, C.E.,
E. C. Osborn.

SOMERVILLE.

Dr. A. P. Hunt.

SOUTH AMBOY.

Dr. A. Treganowan.

SUMMIT.

Dr. W. H. Risk,
Alex. A. Taylor.

TENAFLY.

Dr. Milton Turnure.

TITUSVILLE.

Ira J. Blackwell.

TRENTON.

Dr. F. V. Cantwell,
Hon. E. O. Chapman,
Dr. Isaac Cooper,
Dr. William Elmer, Jr.,
Edward W. Evans,
Prof. W. Hasbrouck,
Dr. Ezra M. Hunt,
F. C. Lowthorp, C.E.,
Dallas Reeve,
Dr. J. I. B. Ribble,
Rt. Rev. J. Scarborough,
Dr. Cornelius Shepherd,
Dr. John W. Ward,
Dr. David Warman,
Isaac Wetherby,
Dr. H. G. Wetherill,

WAVERLY.

Hon. Peter T. Quinn.

WESTFIELD.

Dr. J. B. Harrison.

SUMMARY OF REPORTS FROM LOCAL BOARDS

AND LISTS OF MEMBERS AND HEALTH INSPECTORS, WITH
ABSTRACTS FROM MOST OF THE REPORTS.

BY THE SECRETARY.

In October in each year, as required by law, a printed schedule of inquiries is sent to each Local Board of Health, also containing a blank for the names and post-office address of members of the Local Boards and Sanitary Inspectors.

The following is the schedule of subjects :

SUBJECTS FOR REPORT.

- | | |
|---|---|
| A. Location, population and climate. | N. Alms-house, hospitals and other charities. |
| B. Geology, topography and contour. | O. Police and prisons. |
| C. Water supply. | P. Fire-guards or escapes. |
| D. Drainage and sewerage. | Q. Cemeteries and burial. |
| E. Streets and public grounds. | R. Public-health laws and regulations. |
| F. Houses and their tenancy. | S. Registration and vital statistics. |
| G. Modes of lighting. | T. Quarantine or care over <i>contagious</i> diseases, and vaccination. |
| H. Refuse and excreta (how managed). | U. Sanitary expenses. |
| I. Markets. | V. Heat and ventilation for dwellings. |
| J. Diseases of animals. | W. Prevalent diseases of the year. |
| K. Slaughter-houses and abattoirs. | |
| L. Manufactories and trades. | |
| M. Schools and school and other public buildings. | |

Other subjects may be named under X, Y, Z. The subjects may thus be referred to by the letters.

If the sheet provided is not sufficient, add others, marked with the letters which designate the topic treated.

If details on some of the subjects named have been furnished in former reports, these do not need to be repeated. But each item should be carefully examined and full information given under R. It is always best to state what the Board has actually done. Under W no disease should be reported as having been prevalent unless the writer knows of at least ten cases. The medical member of the Board

should, if possible, give facts as to any epidemic that has occurred, and should note any special needs or defects in sanitary administration.

We do not find it necessary to publish all of each report, and even those from which we publish nothing are of value for reference in the office. Our space permits us only to select such parts as are new, or as are of special interest to the locality and to this Board. Reports are in general promptly received, but a few Boards are dilatory or seem to regard the report as a formality. We regard them as so important that we must insist upon exact conformity to the law. Those who will examine the abstracts will not fail to get valuable information and have opportunity to compare the work and methods of the various Boards.

LEGAL OPINION.

The following questions as to legal points have been answered thus by Judge Wm. M. Lanning, of Trenton :

First. Is a borough located within the limits of a township and in which no Local Board of Health has been organized, subject to the jurisdiction of the Local Board of Health of the township in which the borough is situate?

It is not. The latter part of Section 10 of the Health act expressly provides that "in any township within whose limits a city, borough, town or other form of local municipal government now exists, or hereafter shall exist, the jurisdiction of the Local Board of the township shall extend *only* to such parts of the township as are, or shall be, outside of the territorial limits of such city, borough, town or other local municipal government."

Second. May a physician residing in a borough located within the limits of a township, and in which the borough taxes and township taxes are assessed at the same time and by the same officer, be appointed as a member of the Local Board of Health of the *township*?

I think he may. Section 10 of the Health act provides that the Township Committee, the Township Assessor and one physician to be appointed by the Township Committee, shall constitute the Local Board of the township. If the Assessor or a member of the Township Committee should reside within the limits of the borough, it is clear that that fact would not render him ineligible as a member of the Township

Board. If residence within the borough does not disqualify an Assessor or a member of the Township Committee, there is no reason for holding that it should disqualify a physician.

Third. Is it within the power of the Legislature to extend the provisions of the supplement to the Health act relating to plumbing, passed February 22d, 1888, to townships having a population of 2,000 or more?

This question is not easy to answer. The opinion of the Court of Errors in the High License-Local Option law, lately rendered, might possibly be cited as an authority for the exercise of such a power. I think a safer plan would be to extend the provisions of the Plumbing law to those townships in which the density of population exceeds a certain number per square mile, or to those townships which now have, or may hereafter have a public water-supply.

NOTE.—A Township Board is a legal Board without a physician upon it, but it is always best to have a medical member, if there is one residing in the township. If the Local Board does not in such case appoint one, this Board can and generally does. We get our information direct or from the annual report. The office of Township Physician, where there is such an office in the township, does not make the person a member of the Board of Health, but a medical member of the Board is such by appointment. He must reside in the township, but can be a member of a Township Board if he resides in any borough or town of the township in which the Assessor of the township levies tax.

ATLANTIC COUNTY.

ATLANTIC CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph H. Borton, President, Atlantic City; George W. Sheppard, Secretary, Atlantic City; Edward S. Lee, Atlantic City; Samuel B. Rose, Atlantic City; Jacob H. Leedom, Atlantic City; Eugene L. Reed, Atlantic City; William Read, Atlantic City. Lewis Reed, Jr., Health Inspector.

Atlantic City is situated on the southeast coast of the State of New Jersey, Lat. 39° 22' N., Long. 74° 28' W. Population, 12,000 per-

manent; from 40,000 to 50,000 summer population. In winter, 8 to 10 degrees warmer than 50 miles inland; in summer the same number of degrees cooler than inland, due to the prevalence of sea-breezes during that season.

Atlantic City Water Company get their supply from Doughty's mill-pond and a number of wells of about 50 feet in depth. Consumers' Water Company, artesian well, 1,250 feet deep, pumps 900 gallons a minute, with another well sinking, now at the depth of 800 feet. Some residents still use cisterns.

Rainfall led off by underground trunks and surface gutters leading to creek on meadows, and sewerage by means of the West system of underground drainage.

Streets are gravel, paved and well kept.

As a rule, not more than one family to a house.

Most houses connected with sewer; those not, with brick vaults, cleaned by odorless excavator. Refuse taken to the mainland.

We have four large school-houses, which accommodate about 2,000 school children. Well ventilated and heated.

All hotels have fire-escapes.

All of the usual precautions taken by the Board of Health.

(Signed)

LEWIS REED, JR.,

Health Inspector.

BUENA VISTA TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Benjamin Stoeppleworth, Hammonton; George B. Cake, Landisville; Oreste Repetti, Vineland; John Faux, Vineland. There is no resident physician in the township.

Wells are the only source of water-supply.

There is no system of drainage other than the natural. No sewers. No malaria. Cellars generally dry.

Houses generally have cellars. Vegetables are stored in them in winter. No tenement-houses in the township.

No sewers; cesspools and dry earth closets are in use; very few cemented. Contents used for manure.

No diseases prevalent. The Assessor does inquire as to diseases of animals and losses, and as to contagious diseases.

No slaughter-houses in the township.

No manufactories.

There are five public school-houses and two churches in the township, all in good repair.

One burying-ground in the township.

No township laws in reference to public health.

(Signed)

JOHN FAUX,
Assessor.

EGG HARBOR CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John J. Fritschy, Egg Harbor City; Moritz Rohrberg, Egg Harbor City; Joseph Fecher, Egg Harbor City; Francis Norman, Egg Harbor City.

Our water-supply is obtained from driven wells, from thirty to forty feet deep. The water is of a good quality. We have no other system of drainage than surface drainage, but the natural facilities are good. Nearly all houses have cellars and the cellars are all dry.

No diseases prevailed during the past year and the general health of the city is good. Only four complaints of nuisances were made to the Board during the past year. Upon notice, the nuisances were promptly abated. The sanitary condition of the city is satisfactory.

(Signed)

F. NORMAN,
Secretary.

EGG HARBOR TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. R. M. Sooy, Pleasantville; Isaac Andrews, Pleasantville; John T. Lake, Pleasantville; Dr. Sherman De Mill, English Creek; John I. Carson, Bargaintown. J. W. Smith, Health Inspector, Bargaintown.

There is but little change from what has been formerly reported.

A new ordinance has been passed. Refuse and garbage are handled in quite a satisfactory manner, there being no complaints or trouble during the past year.

The people are becoming educated to the sanitary requirements of the Board of Health.

There have been a few cases of typhoid fever, which were sporadic.

Infantile diarrhoea was rather more prevalent or virulent than formerly.

GALLOWAY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph Sahl, Pomerania; William Robinson, Port Republic; Abram Anderson, Leeds Point; John F. Mathis, Leeds Point; William Parsells, Absecon; Mark S. Somers, Oceanville. Dr. E. H. Masten, Health Inspector, Absecon.

Water-supply by wells, mostly.

Sufficient drainage; water is level; most all cellars dry.

Houses generally have cellars, used to some extent for storing vegetables. Very few houses occupied by more than one family.

No sewers used.

HAMILTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Peter Murdoch, Weymouth; Charles Crowell, Mays Landing; Daniel E. Iszard, Mays Landing; Lewis W. Cramer, Mays Landing; Charles T. Abbett, Mays Landing; D. B. Ingersoll, M.D., Mays Landing. Andrew G. Stewart, Health Inspector, Weymouth.

Our water-supply is chiefly from wells, and these in some tenement-houses are so poorly kept as to call for investigation, as often in summer season they are the receptacles of toads and other filth. In no case should a house be rentable unless supplied with a good well of water.

There have been no changes made in drainage and sewerage since last report.

We must again urge that if there is no law now in regard to the poorly-kept houses for rent, that it should be passed forthwith to require all houses for rent to be placed in a sanitary condition. In many instances the poorer class of persons who rent these houses are ignorant of the effect of the want of these sanitary arrangements, and this, and because the landlords savor strongly of the spirit of the landlords of the Emerald Isle.

There have been no diseases of animals this year in our township.

In our schools and school-houses some change is desirable. The houses should be properly heated with *pure air*. Some are heated by hot air; that is, by heaters in the cellars. And this air is drawn from the confined and impure air in the cellar, and taken up into the room, to be inhaled by the pupils. This certainly should be remedied.

And again, of much greater importance, the pupils are required in our school—and I find it to be so generally in the county—to drink water from *one* pail, in which the water is brought from some neighboring well. *One* cup is provided, and each pupil takes up, generally, what the cup will hold, drinks what he desires and pours back into the pail what he fails to drink, and thus the whole bucket of water soon becomes hardly fit to drink.

Sanitary expenses are met by general tax of township, included in "incidentals."

There have been no prevalent diseases during the year. It has been a year of remarkable health.

(Signed)

D. B. INGERSOLL, M.D.,
Township Physician, Hamilton Township, Atlantic County.

HAMMONTON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James H. Seely, Hammonton; Charles Woodnutt, Hammonton; James P. Patten, Hammonton; A. J. Smith, Hammonton. Edward North, M.D., Health Inspector, Hammonton.

Very little slaughtering now done in the town.

We would report that the Board adopted last summer the code given by the State Board as a model, leaving out one section only, which was not applicable to this town.

One of our difficulties is to get reports of births from our Italian population, which its becoming quite numerous, but think, on the whole, we get nearly all the births.

Nothing of importance to communicate.

(Signed)

A. J. SMITH,
Town Clerk.

MULLICA TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jesse R. Abbott, Chairman, Pleasant Mills; Oliver Gee, Elwood; Theodore Weeks, Green Bank, Burlington county.

No Board formed in this township this year.

(Signed)

W. S. MILLER,
Assessor.

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SOMERS POINT.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

H. H. Vansant, Somers Point; J. H. Vickers, Somers Point.

Somers Point, situated on west side of Great Egg Harbor inlet, bay and river. Population, 400; climate, mild; 1,273 acres.

Water, spring wells, soft and clear.

Drainage, surface; no malaria and no swamps near by.

Houses with cellars used for storage, and no two tenement-houses for families.

Cesspools, half cement and half surface.

No slaughter-houses.

No manufactories.

One school-house, two rooms.

Canvas fire-escapes to hotels.

Two cemeteries.

Laws regulated by council.

No registration.

At present no quarantine necessary.

Sanitary expenses estimated about \$5.

Stoves and heaters for heating purposes.

No prevalent diseases, only colds.

(Signed)

T. D. VAUGHAN,
Borough Clerk.

WEYMOUTH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

D. H. Gandy, Tuckahoe, Cape May county; Wm. Campbell, Hawkinsville, Cape May county; Joshua Smith, Estellville; Hiram Godfrey, Tuckahoe, Cape May county.
Dr B. F. Abbott, Health Inspector.

The general health of our township for the past year has been remarkably good. We have had no disease of any kind, and very few deaths. Acting as the Assessor of the township, I have a good opportunity of knowing the condition of the people, as I go in almost every house, and have for the last two years made inquiry concerning the health and condition of children in all places where it had any appearance of neglect on the part of the parents. I find the last

year one of the most healthy to the inhabitants of the township for many years. Being uncommonly wet and more or less foggy, it was supposed the fall months would bring malaria and fevers of different kinds, but such has not been the case.

Our climate is fine, and we breathe the sea air through the forests, which seems to help to keep us healthy, and is much more healthy than nearer the sea-shore. Our water-supply is from ordinary wells, either dug and bricked or the driven tubular well. Water is soft and fine for either washing purposes or for drinking.

We have no uncommon diseases among our animals.

We have four public schools in the township, with a good attendance, and the children are uncommonly healthy.

We have certainly been blessed the past year with good health.

(Signed)

HIRAM GODFREY,

Assessor of Township.

BERGEN COUNTY.

ENGLEWOOD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob S. Wetmore, Englewood; James Harris, Englewood; J. N. Brinkerhoff, Englewood; Hardy M. Banks, M D., Englewood; G. W. Chamberlain, Englewood. E. H. Canfield, Health Inspector.

Englewood, located on the Palisades and in the valley of the Hackensack. Rolling country, with granite and limestone formation. The water is furnished by the Hackensack Water Company and local wells and springs. The latest improved system of drainage is laid, or being laid, through the town. The streets are macadamized and well taken care of by Road Board and Village Improvement Society. Majority of houses occupied by owners. The streets are lighted by local gas company and oil lamps. The refuse, &c., is carried to public dump-ground. The markets are clean and well looked after. All meats are brought from Jersey City and New York, so that there is practically no slaughtering done in the township. Schools are built with all the latest sanitary improvements. A hospital will shortly be built. The town has an efficient fire company, with ample hose, &c. Two cemeteries are under good management and control. The Local

220 REPORT OF THE BOARD OF HEALTH.

Board of Health is composed of energetic men, who look after the health of the town. The Assessor, who is Clerk of the Board, acts as Register of Vital Statistics. Sanitary expenses are, when necessity arises, obtained from public-spirited citizens. The principal disease for the year is typhoid malaria and other types of this disease.

(Signed)

E. H. CANFIELD,
Health Inspector.

FRANKLIN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Post, Wortendyke; Wm. G. Ackerman, Wortendyke; Albert Lozier, Campgaw; John W. Ackerman, Assessor, Oakland.

HACKENSACK.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James A. Romeyn, Secretary, Hackensack; J. S. C. Wells, Hackensack; Abraham D. Brower, Hackensack; Lemuel Lozier, Hackensack; Louis Perrott, Hackensack.

Hackensack is situated on the west bank of the Hackensack river, about 12 miles north of New York city. Latitude $40^{\circ} 53' N.$, and longitude $74^{\circ} 3' W.$ from Greenwich.

- At a rough estimate it includes about 2,000 acres. Population of from 6,000 to 7,000. Climate agreeable though variable. Notable for the health and prosperity of the people.

Beautifully located in a pleasant valley, through which flows the Hackensack river, in which the tide rises and falls 4 to 5 feet.

Water-supply ample; obtained from the Hackensack river, above the influence of the tide or navigation; supplied by "Hackensack Water Company, Re-organized." The same source also supplies Englewood and Hoboken. Supplied by a reservoir at an elevation of 110 feet above the town. The reservoir, however, only takes the back-water, as the pumping supply is sufficient. Water rarely discolored. Possibly an iron taste. Neither soft nor hard; medium. At no special season of the year is it bad to taste or discolored, but at times it has a fishy taste, which is said to be due to a peculiar weed. No sewage above the supply. A good many wells are used, but few cisterns.

Sewerage well arranged. Several thousand feet of sewer has been laid, the river giving a good outlet for all draining purposes. The system is composed of large brick sewers as outlets, with pipe laterals. There are some ditches for draining, and one creek which is used for sewage, which the Board of Health has ordered discontinued, and an ordinance is in force to stop further use. Cellars generally dry. On the south are salt-meadow swamps, but malaria is not frequent, few cases of it being known.

Streets worked to established grades, curbed and guttered, and sidewalks good. Some Macadam pavement.

Many houses occupied by the owners. Very few houses are occupied by two or more families. Few basements; mostly cellars. It is safe to say that vegetable matter is not generally stored in cellars.

Gas generally used for lighting.

Refuse and garbage, &c., removed by scavengers, and excreta by an odorless excavating company. Sewers are generally used. Cess-pools must be laid up with cement and made water-tight. Some old ones are open at bottom; emptied by scavengers or by odorless company.

No general markets.

No epidemic among animals has existed.

No slaughter-houses, save where butchers occasionally kill. These places are inspected and kept clean.

The manufactories consist of silk mill, brick-yards, and silver works.

School buildings well ventilated and heated. They are under the most skillful management. Two large buildings of the most improved kind heated by steam, both direct and indirect. One smaller school-house heated by stoves, but in good condition. Our school buildings are in every way A No. 1.

The alms-house not in town. One hospital with 16 to 20 beds. Township care for poor, besides other charities in this line cared for by the churches and ladies' aid societies.

A small uniformed police force. An excellent county jail, well ventilated and drained into the creek.

A regularly-organized fire department with improved apparatus. The water-supply has force enough to throw over the highest building. An electric fire alarm, with street signal boxes, and a good alarm bell.

222 REPORT OF THE BOARD OF HEALTH.

An old cemetery exists in the town, which is still being used ; the new ones are beyond the limits.

A Board of Health doing good work. All complaints are promptly attended to by the Inspector, and reports given to the Board.

Board of Health has sanitary supervision of the town.

The expenses have been from \$250 to \$300, so far.

Dwellings are heated by steam, furnaces, stoves, &c.

No epidemic, and very few contagious or infectious diseases.

(Signed)

J. A. ROMEYN,
Secretary.

HARRINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Abram K. Knight, Chairman, Closter; Jacob J. Demarest, Secretary; John H. Mence, River Vale; Barney N. Ferdon, Closter; H. A. Crary, Closter.

The foregoing persons constitute a Board of Health for the township. We have no incorporated towns within the township; two small villages. The houses for the most part are occupied by the owners, and where there are two families in a house, one is the owner. No part of the township is supplied with water from any stream for potable use, but every house has either a cistern or well, or both. There are a few cellars that have water in very rainy seasons of the year. The health of the people has been very good. Some malaria, but not to any great extent. There have been several deaths from diphtheria, but the cases were all confined to the families where it first appeared. The physicians have, during the year, up to the present time, been very prompt in filling out blanks and reporting births, deaths, &c., to the Assessor.

(Signed)

JACOB J. DEMAREST,
Assessor.

HOHOKUS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Lewis Henry May, Ramseys; John Ackerman, Ramseys; Abram Banta, Mahwah; W. H. Murray, Assessor.

LODI TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James Van Bussum, Chairman, Garfield; John Van Bussum, Assessor and Secretary, Corona; Charles Mathe, Carlstadt; Henry Stromeyer, Little Ferry; Dr. Martin Tygert, Township Physician, Carlstadt.

The water-supply is from wells, cisterns and springs.

There is no drainage or sewerage.

The streets are generally in good condition; there are no public grounds.

Houses are generally occupied by their owners, and mostly built with cellars for the storage of vegetables.

Kerosene oil is mainly used for lighting.

Refuse and excreta are used to sustain domestic animals and to fertilize the soil.

There are no markets.

No diseases have been prevalent among animals.

There are no slaughter-houses.

There are no manufactories causing evils to health.

There are six schools, fairly prosperous, and school-houses in good condition; no other public buildings, unless churches are so considered.

No alms-houses, hospitals or other charities.

No police or prisons.

There are two or three well-organized fire companies.

There are two cemeteries.

Health laws and regulations altogether under the control of the Township Board of Health.

Registration and vital statistics under the care of the Assessor, and are forwarded monthly to Trenton.

One case of small-pox has occurred; proper efforts were made, and successfully, so as to prevent contagion.

Sanitary expenses, as yet, have received no attention.

Houses mostly heated by stoves, and ventilation generally obtained by doors and windows.

There has been no prevalent disease.

(Signed)

JOHN VAN BUSSUM,

Secretary.

MIDLAND TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

L. Hague, Oradell; H. W. Winters, Oradell; J. R. Oldis, Rochelle Park; John C. Van Sann, Assessor, Maywood.

The township of Midland is situated in the county of Bergen and State of New Jersey; it has 9,530 acres.

The water-supply comes from wells and cisterns and two rivers.

Drainage is natural.

Houses generally have cellars; largely used for storage of vegetables.

No system of sewerage.

Do not know of any prevalent disease.

No slaughter-houses in township.

No new manufactories.

ORVIL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles W. Badeau, Allendale; B. O. Blenis, Saddle River; Elijah Rosencranze; Hohokus; George B. Smith, Allendale; Abram H. Ackerman, Assessor, Saddle River.

Water-supply—natural streams, wells and springs. The streams are all running water.

Drainage natural, except a few bog-swamps, which are drained by ditching.

Houses about all have cellars, which are largely used for storing vegetables; not any tenement-houses for more than two families.

A few cesspools; contents used as fertilizer.

No prevalent diseases. It has been unusually healthy in the township this year.

No slaughter-houses in township.

One woolen and one cotton mill; no injury to health from them.

(Signed)

ABRAM H. ACKERMAN,

Assessor.

PALISADE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Milton Turnure, M.D., Tenaflly; John H. Huyler, Tenaflly; Alfred Jarvis, Tenaflly; N. C. Demarest, New Bridge; J. H. Anderson, Schraalenburg.

RIDGEFIELD.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Frederick Grace, Chairman, Coytesville; John C. Abbott, Fort Lee; John S. Edsall, Leonia; Jno. H. Mannix, Assessor, Fort Lee.

RIDGEWOOD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. A. King, Chairman, Ridgewood; Edward Keeley, Ridgewood; John G. Hopper, Assessor, Ridgewood; Dr. J. T. De Mund, Medical Member, Ridgewood. Wm. E. Maltbie, Health Inspector, Ridgewood.

One small public sewer for waste-water, otherwise private sewerage.
The streets and public grounds are under control of town committee.
No manufactories except new brick silk mill, just finished.
Two schools. One just finishing a driven well, in place of open well, which was declared foul.

No cemetery in township.

No prevalent diseases. Place unusually healthy.

(Signed)

WM. E. MALTBIE,
Health Officer.

RUTHERFORD.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William A. Preston, President, Rutherford; Dr. H. H. Hollister, Rutherford; Dr. John J. Ketcham, Rutherford; Peter Dammers, Rutherford; Josephus C. Sares, Rutherford. Geo. P. Rice, Secretary and Health Inspector.

Driven wells, cisterns and natural springs furnish the water-supply.
Natural drainage; sloping ground both east and west, carrying sur-

plus water toward the meadows and the Passaic river. The question of sewerage is under careful consideration by our present Board of Councilmen. House drainage is at present conducted into cesspools.

We have completed about two miles of Macadam this season, and the work will be continued next season. There are no public parks.

The houses are almost without exception, built with cellars, and but three buildings are used as tenement-houses. We have not as yet provided for a yearly inspection, but under the direction of the present Board, I am making a list of all the buildings within the borough, to include water-supply, drainage, number of families and other important matters, and we propose to keep this arrangement up hereafter.

Lighting is by oil lamps.

Cesspools are built with open bottom and brick and cement sides; lately, some have been built up close, and emptied at stated intervals, by a company at Jersey City who make a business of it.

No public markets; all stores are conducted for individual lines of goods.

About last May, June and July we had quite a few cases of diphtheria, caused by stagnant water collected by the excessive fall of rain during the early spring; as the ground dried, the cases diminished; all the trouble seemed to be located in particular districts.

Our present school, No. 40, being too small, we are building a new one, separate from the original building, and to be used exclusively for the primary classes. One of our sanitary officers being the District Clerk, keeps a fatherly eye to these matters, so that we have had unusually good health in these quarters.

The Police Department is conducted by the local authorities; we have a lock-up, only being an eighteen-foot square wooden building, suitable only as a menace to evil-doers, and used very little; it is generally termed a sweat-box.

Hillside Cemetery is the only burial-place.

I wrote you some time ago, expecting to enclose with this report a pamphlet with printed regulations, and fines for neglecting them; as the printer has not yet completed his work, am unable to forward at present. The rules laid down are simple and quite complete, and we trust by vigilance to have them enforced in the future.

In conclusion will state that at present we have about the first Board of Health that has made an attempt to make it a Board in

fact, and not fancy. A great many nuisances have been caused to be abated, and as case after case has been pushed we find that the feeling seems to be that the orders of the Board will have to be complied with, and not near the trouble is experienced now in having offending parties promptly abate nuisances when ordered. We have no distinct disease here, peculiar to the locality. Generally speaking, Rutherford is an exceedingly healthy place. Reports of vital statistics are generally promptly made.

(Signed)

GEO. P. RICE,
Secretary.

SADDLE RIVER.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Gilbert B. Ackerman, Chairman, Rochelle Park; Isaac A. Hopper, Secretary, Fair Lawn; Richard T. Snyder, Paterson; Wm. H. Doremus, Dundee Lake.

We have very little to report from this township this year. We have had no complaints made. The health of the people has been very good; no epidemics of any kind. As to animals, from the inquiries I have made there have been very few losses this year, and no prevalent disease amongst them.

(Signed)

ISAAC A. HOPPER,
Secretary.

UNION TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James Van Roden, President, Rutherford; A. L. Watson, Secretary, Rutherford; Dr. J. W. Phelps, Rutherford; John Kehoe, Lyndhurst; Edward T. Gallaway, Kingsland.

Refuse is removed by New Jersey Sanitary Co., of Passaic, N. J.
One new school-house at Kingsland, cost about \$8,000.

WASHINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alonso House, Chairman; John C. Blauvelt, Abram S. Van Horn; John H. Wortendyke, Assessor.

BURLINGTON COUNTY.

BASS RIVER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jno. W. Harris, New Gretna; D. M. French, New Gretna; Chas. H. Cramer, New Gretna; C. Garrabrant, M.D., New Gretna; E. Russell Cramer, Assessor.

We have not formally organized a Board of Health, as the township is healthy and we have no nuisances detrimental to health.

(Signed)

E. RUSSELL CRAMER,

Assessor.

BEVERLY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Conover, President, Bridgeboro; Chas. K. Van Sciver, Secretary, Beverly; Jacob Perkins, Beverly; Chas. Russ, Beverly. H. H. Matson, Health Inspector, Beverly.

Water-works, owned by company, have been erected in Beverly city and the pipes extended into the township. Some few houses take it. The Delaware river is the source of supply.

The health laws are generally appreciated and regarded, and it is not difficult to observe the improvement in the sanitary condition of this vicinity within the last few years.

The registration of vital statistics is not perfect. The physicians are inclined to send them to the wrong person. With us, I think the City Clerk receives many from the township, instead of the Township Assessor.

There has not been any epidemic this year, and the general health is good.

BORDENTOWN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

H. H. Longstreet, M.D., President, Bordentown; D F. Waker, Secretary, Bordentown; Lewis Jemison, M.D., Bordentown; I. D. Young, M.D., Bordentown; Wm. H. Shippe, M.D., Bordentown; J. D. Flynn, Bordentown; Prof. William MacFarland, Bordentown. H. N. Jobee, Bordentown, Health Inspector.

The sanitary condition of Bordentown at the present time is more satisfactory than at any previous period during the past ten years. There is a growing disposition on the part of a majority of our citizens to recognize the value of preventive means as an important factor in the maintenance of health ; hence, our Board of Health experiences little difficulty in securing their hearty co-operation in whatever concerns the health of the community. During the year a thorough inspection of the sanitary condition of all dwellings and premises within the city limits was made by the Health Inspector and assistants. This work necessarily involved considerable labor and expense, but the results demonstrated the value and necessity of the undertaking. According to the report of the Health Inspector, 399 families derive their water-supply from hydrants and seven from cisterns, while twenty-six families are reported without any water-supply of their own, depending solely upon the courtesy of kind neighbors to satisfy their needs ; the balance, numbering 493 families and representing more than one-half of our entire population, depend upon sunken wells. In the great majority of instances the water thus obtained was found to be in good condition and free from organic pollution. In not a few instances, however, the wells or their surroundings were in a most deplorable state. In some cases water was taken from wells that had not been cleaned for many years, or whose close proximity to neglected cesspools or other sources of foulness rendered contamination of the water almost inevitable. The question of soil percolation as a means of water contamination is one too little known or appreciated, and a subject about which too much can neither be said nor written. In small towns and villages, water for domestic purposes is largely derived from wells, and so long as certain precautions are taken to prevent pollution of the water, this may be regarded as a satisfactory and, for the most part, safe method of supply. But as population increases, as the villages and towns become more closely built up and merge into cities, then the well, unless there be strong arguments to the contrary, must give way to other and safer mediums of supply. While, with us, there may not as yet exist any special danger in this direction, still the occurrence during the past month of several well-defined cases of typhoid fever in families who depend exclusively upon wells for their supply of water, and the absence of the disease amongst those who abstained from its use, leads to the belief that hereafter a greater degree of caution will be necessary in

order to avert further evil of a like nature. Certain it is, the future will undoubtedly condemn what is now sanctioned or, at least, permitted to exist undisturbed. Whatever the source of water-supply, whether by wells or by means of other more modern methods, the question of purity, involving as it does the health of whole communities, is one that should at all times call for the exercise of the closest scrutiny and utmost watchfulness at the hands of those to whom the care of the public health is entrusted. Another fact developed by the late inspection relates to vaccination. The records showed that 414 persons, or about eight per cent. of the entire population, were unvaccinated, or more properly speaking, unprotected against the approach of small-pox, should they, in any way be exposed to the contagion. With all the knowledge now possessed of the protective power of vaccination, any neglect to avail ourselves of this agent is little short of criminal. In order that no one could plead poverty as an excuse, the Board of Health at once advertised to furnish free vaccination to all who from want of means were unable to obtain it. A number availed themselves of the privilege. Never before in the history of Bordentown has there been so thorough and systematic an effort towards improving the sanitary condition of the city as was made during the past year. The good work commenced will be continued until the hygienic surroundings of our city rank second to none in point of completeness.

(Signed)

WILLIAM H. SHIPPS, M.D.,

Reporter.

BORDENTOWN TOWNSHIP.
NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Robert H. Allen, President, Bordentown; Isaac Elliott, Jr., Secretary, Bordentown; Theodore Carter, Fieldsborough; Langhorn Thorn, Bordentown; Dr. W. H. Shipps, Bordentown; James Powell, Bordentown. Horatio N. Jobes, Health Inspector, Bordentown.

We have nothing to report this year, as the city nearly covers the whole township and gives us nothing to do.

BURLINGTON CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William H. Kimball, Burlington City; Shippen Wallace, Burlington City; Edward S. Lansing, Burlington City; Robert W. Waln, Burlington City; J. Hutchinson Lukens, Burlington City. Charles Stowell, Health Inspector, Burlington City.

The source of water-supply is from the river Delaware. Public supply. Board of Water Commissioners. Controlled by Common Council. Nearly all houses have it introduced. Not discolored. No iron in it. Soft. Not bad at any season of the year. Reservoirs are cleaned. No sewer outlet above intake. Very few depend on wells; none on cisterns.

The system of drainage for the ground is separate and apart from sewers. Cellars dry, except during heavy rain-storms, when surface-water flows in. No sewers of any amount; one only, on York street, and that only some three blocks in length.

Houses generally have cellars. But few houses are occupied by more than one family.

Sewers not used to any extent. Only very few houses connect with them. Cesspools built of brick, cemented. Emptied by night-soil men after October 1st. Contents taken out to suburbs and composted with coal ashes.

Malarial diseases most prevalent in September. No contagious diseases among animals. No register kept of persons keeping cows, hogs, &c.

Slaughter-houses not a nuisance.

No evil to health from manufactories.

(Signed)

I. RUSSELL BATTEN.

CHESTER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joe. T. Sullivan, Moorestown; Wm. Hutton, Moorestown; Morris Comfort, Moorestown; J. C. Stroud, M.D., Moorestown; S. S. Dager, Assessor, Moorestown.

CHESTERFIELD TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

John F. Rogers, Crosswicks; Simeon Hannold, Crosswicks; Thomas W. Ridgway, Chesterfield; Charles B. Holloway, Chesterfield.

We have nothing of special interest to report. There have been a few cases of chills, but none at present. The general health of the township has been good. There has been no complaint made to the Board.

(Signed)

CHARLES B. HOLLOWAY,

Assessor.

CINNAMINSON TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Wm. R. Lippincott, President, Cinnaminson; J. D. Janney, M.D., Township Physician and Secretary, Cinnaminson; Edward H. Ogden, Riverton; Isaac Evaul, Palmyra; Timothy Morton, Assessor, Parry.

The water-supply is by wells and cisterns. We know of but one family depending on cistern-water for drinking purposes. The well-water of the township is generally good, but hard.

There is no drainage except by surface and tile. Cellars are dry. Land, rolling. There are two creeks—the Pensauken and the Pompeston—the first forming the west line of the township; the other running from south to north through the township, emptying into the Delaware river. These streams are subject to tide-water and skirted by swamp or low lands, which generate malaria. We have had about the usual amount of malarial fevers this summer and autumn. We know of no fatal cases of such fevers this season.

The houses generally have cellars. We know of but little use being made of house-cellars for storing vegetables. Farmers generally use outside buildings for such purposes, with cellars under them, when they store vegetables. There are no tenant-houses of more than two families, and very few of more than one family, in this township. There is no yearly house-to-house inspection, but families are frequently cautioned, by posted circulars, to look well to cleanliness of all buildings, outbuildings, gutters, &c.

There are a few water-closets in villages, having cemented vats

under them, which are emptied by casting the excrement away into the open country and depositing it into compost beds for fertilizing purposes on farms. Water-closets in this township are generally without means of catching excrement, except on the surface of the earth. The excrement is required to be carted to the open country often enough to keep such places free from offensiveness. It is frequently deodorized with earth, ashes or lime. We think there has been improvement in this particular by the inhabitants of our township within two years.

There has been no unusual prevalence of disease this year. The Assessor inquires each year as to losses of animals and as to contagious diseases.

Slaughter-houses are inspected and kept clean, so as not to offend people.

There are several grave-yards in this township, but none, except the one near the Palmyra M. E. Church, which is likely to prove detrimental to the inhabitants.

We think care is taken to have school-houses as well ventilated as circumstances will allow, and we know of no crowding of scholars to the production of ill health. Our public halls are commodious, light and airy.

The public health laws are reasonably well regarded.

We believe that vaccination is well looked after, and the spread of contagion prevented.

We incur very little expense in our sanitary labors.

Houses are generally heated by stoves in the rooms to be warmed. There are some cellar-heaters; a few heat by steam. Buildings are generally well ventilated.

(Signed)

J. D. JANNEY, M.D.,

Secretary and Executive Officer.

DELRAN TOWNSHIP.

NAME AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. P. Austin, Bridgeboro; John Folz, Riverside; John McCleary, Riverside; Chris. Heiss, Riverside; W. T. Caldwell, Bridgeboro. Alex. H. Small, M.D., Riverside, Health Inspector.

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EVESHAM TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David D. Griscom, Marlton; Richard H. Leeds, Marlton; John W. Stratton, Marlton; P. V. B. Stroud, M.D., Marlton; William L. Brown, Marlton.

Families supplied with water by wells; generally good.

Considerable underdraining to fit land for agricultural purposes, yet some cellars have water in, in the spring of the year or unusually wet times. No swamps of any extent.

The Assessor has inquired and not heard of any contagious diseases amongst animals.

But one or two slaughter-houses in the township. No complaint as a nuisance.

(Signed)

WILLIAM L. BROWN,
Assessor.

FLORENCE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Chas. A. Baker, M.D., Secretary; John Peacock, Robert Cotton, Chas. H. Lucas; John Kale, Assessor. C. A. Baker, M.D., Health Inspector.

We have good natural drainage towards the river.

There is a water-supply pumped from the river into tanks, from them to a few fire-plugs, which are inadequate in case of fire, being so few in number. However, these plugs are used to wash out the alleys, and are thereby of sanitary value.

The refuse is removed by carts, and carted through the town to an adjoining farm.

We have two slaughter-houses in the town, which are a nuisance. But most of the meat comes from Trenton already dressed.

We have one school-house, with about 300 children in attendance. There is an Episcopal burying-ground in the heart of the town, with wells from which drinking-water is drawn, all around it.

No typhoid fever here for years. Malarial troubles the most prevalent, the type being intermittent.

(Signed)

CHARLES A. BAKER, M.D.

LITTLE EGG HARBOR TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

I. L. Cowperthwaite, President, Tuckerton; T. T. Price, M.D., Secretary, Tuckerton; Francis French, Tuckerton; Charles M. Berry, Tuckerton; W. Otis Jones, Assessor, Tuckerton.

Water-supply from wells; raised by pumps, chiefly.

No drainage, except surface drainage. Natural surface drainage good. No sewerage, except surface gutters in some of the streets in Tuckerton. Cedar swamps on the streams. No malaria.

Houses generally have cellars, which are generally dry; not many with two families. No inspection.

Kerosene lamps are used for lighting purposes.

Very little garbage thrown in streets or roads. But few cesspools. Excreta usually composted and used on land.

No epidemic among animals.

One slaughter-house. No inspection.

No manufactories that are nuisances. The fish-oil factories would be, but are located on an island in the bay away from population.

School-houses in healthy localities.

(Signed)

T. T. PRICE, M.D.,

Clerk.

MANSFIELD TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

John R. Naylor, Columbus; Benj. H. Atkinson, Columbus; Benj. T. Warren, Columbus; Dr. D. G. Van Mater, Columbus; Abner J. Page, Columbus.

There has been nothing special to report; no prevailing epidemics. We have been comparatively healthy this year. The Board has been called out but once.

MEDFORD TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

E. H. Kirkbride, Medford; Henry Garwood, Medford; J. Reeve, M D., Medford; Chas. H. Kirby, Medford.

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No drainage, except surface. Water-level low, so that dry cellars are secured. Some malaria. No swamps near.

No basements. Cellars used generally for vegetables.

No sewers. Most cesspools are built with open bottom. Emptied by pumping into a hole near by, dug for the purpose.

Slaughter-houses are generally in good condition and are inspected.

Township has been unusually free from contagious diseases during the past year.

MOUNT LAUREL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Andrews, Fellowship; S. R. Sharp, Mount Laurel; F. K. Dudley, Moorestown; J. B. Joyce, Assessor.

NEW HANOVER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. R. Kirby, Clerk, Wrightstown; Lorenzo D. Woodward, Cookstown; Thomas Platt, Wrightstown; William Poinsett, Jacobstown; Amos Shaw, M.D., Jacobstown. George C. Davis, Chairman and Health Inspector, Wrightstown.

I submit the annual report of New Hanover township for the year 1888. For the year, the health of the township has been generally good, there being no contagious diseases among the people. The inhabitants have in the past years been educated to the importance of looking after the sanitary condition of their dwellings and the importance of removing every slough-hole by draining of the refuse and excreta, thereby overcoming or removing the germs which breed disease. A year or two back, malaria and typhoid fever were very prevalent. But the rainfall of this year having been so much greater in quantity, has filled up the streams, and thus keeping them pure, prevented the water becoming stagnated. I have noticed the people living along the same have been more healthy than when it was very dry. In the country the cellars are used for the storage of vegetables, these being put in the cellar in fall of the year, then taken out in the spring. There is not one farmer in fifty who has a potato or vegetable cellar unattached under the house. We had pleuro-pneumonia in a herd of cattle belonging to George Higgins. The State Veterinary Surgeon inspected the herd and ordered them killed. There

was no further spread of the disease. All other subjects relating to the sanitary condition of the township have been fully reported in the reports of former years.

(Signed)

GEORGE C. DAVIS,
Assessor.

NORTHAMPTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. G. Parry, President, Mount Holly; Chas. Travis, Clerk, Mount Holly; J. Fred. Lanmaster, Mount Holly; Samuel B. Keeler, Mount Holly. Geo. Branson, Health Inspector.

The water-supply is from Rancocas creek. Private company. Water is discolored. No trace of iron. Is soft. Apt to be bad when very low water. Reservoirs are cleaned twice a year. Receives some sewage from Smithville. No examinations made as to pollution, &c., Township Board of Health having no legal authority. About one-third or more depend on wells. No cisterns.

A portion of the town is drained by eight-inch pipe sewers. No other system of drainage. Cellars are not all dry. Some swamp on one side of the town, but no malaria to remark this year.

Sewers just constructed according to a plan completed under the direction of Col. Waring, but a large number of cesspools are used.

Town has just voted incorporation.

No house-to-house inspection.

Houses mostly have cellars. Very few, if any, houses used by two families.

The sewer system is about three miles long.

Cesspools are not cemented. Emptied by buckets, if ever. Some never emptied, being down to the water line.

Sewers are not yet very generally used; not half of those on the line use them.

We had some scarlet fever during the spring.

(Signed)

CHAS. E. TRAVIS,
Secretary.

PEMBERTON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jos. L. Budd, Pemberton; A. H. Fort, Pemberton; J. N. Smith, Pemberton; W. K. Budd, Assessor, Pemberton.

RANDOLPH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. A. Maxwell, Wading River; J. V. Cavileer, Lower Bank; John W. Adams, Green Bank; John E. Gary, M.D., Lower Bank; Lewis A. Adams, Assessor, Lower Bank.

Randolph township is in the southeastern part of Burlington county. Population about 400. Climate salubrious.

The ground is a level, sandy soil, intersected by swampy and marshy tracts along the streams.

Water-supply from wells.

Natural sewerage and drainage.

Buildings are frame dwellings, occupied by watermen and farmers.

Refuse and excreta are disposed of as suits convenience.

Three schools and two churches. The buildings are situated on hills, so as to secure drainage, and in healthy localities.

SHAMONG TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George H. Wisham, Tabernacle; Samuel L. Daughy, Indian Mills; Ira Crain, Indian Mills.

SMITHVILLE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Isaac Uncles, Chairman, Smithville; B. W. Storey, Smithville; Geo. W. Frazier, Smithville; R. R. Barrington, M.D., Mount Holly. Geo. W. Craig, Clerk and Health Inspector.

The water supplied to a part of the inhabitants of Smithville is from the creek that runs through the same, which is pure and of good quality. It is supplied by the H. B. Smith Machine Co. About fifteen houses take it. The water is discolored at times, especially during heavy rains, but generally becomes clear in from six to twelve hours, and is quite soft; have not known it to be bad at any one season of the year. Pipes are closely looked after, and there is no sewage or other foul matter above the point of supply. The rest

of the inhabitants of the village, numbering about fifty houses, are supplied from wells, which yield most excellent water.

There is no system of drainage needed. In part of the village the water-level is such that the cellars are always dry. The other part is drained with tile, laid under the cemented bottoms of the cellars.

All houses have cellars, and there is no house with two families.

Cesspools in part of the place are built with open bottoms and backs; the other portion are cemented sides and bottom, and are emptied and hauled away with teams.

There is but one slaughter-house, and that is strictly inspected from time to time.

(Signed)

GEO. W. CRAIG.

SOUTHAMPTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John W. Haines, Vincentown; Francis C. Naylor, Vincentown; Saml. Dixon, Vincentown; Dr. J. C. Brown, Vincentown; Charles C. Naylor, Assessor.

Water-supply by wells. Mostly soft, but not all.

We have no drainage system. Very few houses are troubled with water in cellars. No swamps near us. As we have some low meadows, chills and fever are sometimes prevalent.

Cesspools generally open and contents carted out on the land.

The prevalent disease in our township has been diphtheria. About four to five miles above here, in the woods, it has been very bad, and fatal in most every case.

SPRINGFIELD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David Stockton, Jobstown; Charles Deviney, Juliustown; Isaiah King, Jacksonville.

Population 800.

Well-water is used; good.

Drainage good.

Cellar to houses. Single families.

No diseases.

Two slaughter-houses; no complaint.

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Schools, six—public.
One policeman and lock-up.
Four cemeteries.
Stoves used for heating.
Township healthy.

WASHINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Gustave Voss, Green Bank; Geo. Wright, Batsto; Tower Sooy, Green Bank; A. E. Koster, Assessor, Green Bank.

Washington township, Burlington county, is very thinly settled.
The water-supply is good—from wells.
Township very healthy.
Only one family in a house.
No prevalent diseases.

(Signed)

A. E. KOSTER,
Assessor.

WESTHAMPTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Uriah Borton, Burlington; William Deacon, Mount Holly; Chas. F. Hulme, Mount Holly; R. R. Lippincott, Assessor.

WILLINGBORO TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Oliver Parry, Beverly; A. J. Jorden, Burlington; Alex. Thomson, Rancocas; I. M. Stokes, Rancocas.

WOODLAND TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Nicholas P. Todd, Shamong; John A. Bosarth, Vincentown, Edward Layton, Pointsville.

CAMDEN COUNTY.

CAMDEN CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Chas. Watson, President, 432 Federal street; Geo. F. Hammond, No. 20 South Third street; Herman W. Miller, Mount Vernon, corner of Eighth street; Wm. T. Mead, 601 West street; Thad. P. Varney, 264 Kaighn's avenue; John W. Druges, M.D., 1801 Broadway; George R. Fortiner, M.D., 542 Federal street. J. D. Leckner, M.D., 260 Kaighn's avenue, and Septimus Knight, 127 Kaighn's avenue, Health Inspectors.

Location on the Delaware river, opposite the city of Philadelphia. Population, estimated, 60,000 to 65,000. Climate generally healthy. Area of city about 3,550 acres.

Sandy, with in some locations a slight layer of gravelly loam; contour from two and a half to twenty feet above high-water.

Reservoir water-supply, taken from the Delaware river.

This city is drained by many sewers, their outlet being the Delaware river; two of the sewers in the southern part of the city have their outlet into the meadows (and are supposed by physicians to have caused a great amount of sickness in that locality). The city authorities, urged by the Board of Health, have commenced a series of ditches in these meadows, which will be the means of carrying all drainage from said sewers into the river.

Streets are generally paved. Those that are not, generally have paved gutters. They are cleaned by contract and are in a fair condition. We have some streets near the river that have no sewers in them and are very near level, causing stagnant water to stand in gutters, but the city authorities are putting in sewers, which will eventually overcome the difficulty.

Houses very near evenly divided between frame and brick, and generally occupied by one family.

Gas, naphtha and electric lights.

Refuse and excreta are mostly taken to farms outside the city limits. Privy vaults cleaned by odorless apparatus.

Two general market-houses and many private ones. Good condition.

Several private slaughter-houses, which drain into public sewers.

Iron works, asphalt block manufactory, machinery, chemicals,

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woolen goods, dye stuffs, nickel works, fertilizers, woolen goods, cord and tassel, fruit canning, tallow and soap works, ink, lithographic works, &c.

Public schools and several private ones, well drained, heated and ventilated; city hall, county court-house and jail.

Cooper Hospital, Homœopathic Hospital, Camden City Dispensary and Camden Home for Friendless Children and Colored Orphanage, also a charitable organization for the relief of the poor.

One Chief of Police and forty-two patrolmen, city jail and Camden county jail.

All schools and public buildings have fire-escapes. All buildings of three or more stories in height, where thirty or more persons are employed or congregate, are required to have fire-escapes.

Four cemeteries. The State law in regard to burials is strictly enforced.

We have two codes, one in relation to nuisances, &c., and one governing the plumbing and drainage. The latter went into effect October 26th.

Registration of births, deaths, &c., is required as per State law.

In all cases of contagious diseases thorough disinfection of the room and of all discharges from the patient is required, and after recovery or death the house is fumigated. No public funeral is allowed.

Two thousand dollars were appropriated for the expenses of the Board.

Nearly all public buildings are heated by steam, except the school-houses, which have furnaces. The greater number of private residences by stoves.

Typhoid fever has been the most prevalent disease of the year, with a sprinkling of scarlet fever and diphtheria. In the main, the last year has been free from any marked epidemic.

(Signed)

SEPTIMUS KNIGHT,
Health Inspector.

CENTRE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Ezra C. Bell, Mount Ephraim; John Hutchinson, Mount Ephraim; David H. Shreeve, Mount Ephraim; Charles C. Clark, Mount Ephraim. Franklin E. Williams, Town Physician and Health Inspector, Haddonfield.

DELAWARE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. A. Meredith, Haddonfield; Wm. Graff, Ellisburg; Samuel T. Coles, Ellisburg; Wm. D. Coles, Ellisburg. W. S. Long, Health Inspector, Haddonfield.

The Board of Health for Delaware township report the occurrence of an epidemic of scarlatina in the neighborhood of Ellisburg, in the Seventh School District, in the month of December, 1887. The school was closed two weeks, during which time twelve children were affected. It was of a mild type, and was not followed by any evil consequence. With this exception we have been free from all diseases, either in man or lower animals, calling for our attention.

(Signed)

W. S. LONG,
Health Inspector.

GLOUCESTER CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jas. A. Wamsley, M.D., President, Gloucester City; Duncan H. Blake, M.D., Gloucester City; Wm. J. Thompson, Gloucester City; Thos. K. Costello, Gloucester City; J. Edgar Parker, Gloucester City. Patrick Mealey, Health Inspector.

Located on east side of Delaware river. Newtown creek is on the north and runs almost around the city. Little Timber creek is on the south side. The population of the city is between 7,000 and 8,000. The climate is not considered very healthy, as there are quite a number of inhabitants who have malaria.

The water-supply of city is principally from springs through reservoir located near Newtown creek. When said supply is not sufficient (which is not often), they open gate and get water from Newtown creek. Both creeks are filled, at high water, with reeds, except in the center of stream. The water, when high, flows all over the meadows, which are filled with reeds.

There are but two sewers in this city.

Streets. Some of them are in bad condition; generally stagnant water settles where there is no drainage.

Gas is used for street lamps in city, and gasoline in outskirts. Electric lights are used in some parts of city.

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There has been a Board of Health organized separate from City Council, and they have passed a Sanitary Code and propose to enforce it.

Sanitary expenses. The Common Council appropriated \$600; the Board wants it increased to \$1,000.

(Signed)

DANL. F. LANE,
Secretary of Board of Health of Gloucester City.

GLOUCESTER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Brewer, Blackwood; Charles Stevenson, Blackwood; Jos. E. Hurff, M.D., Blackwood; Seth C. Bishop, Kirkwood; Jos. S. Stewart, Chew's Landing.

HADDON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Stoy, Chairman, Haddonfield; W. C. Nicholson, Secretary, Haddonfield; Samuel Wood, Haddonfield; J. Stokes Coles, Haddonfield. F. E. Williams, M.D., Health Inspector, Haddonfield.

The water-supply is from wells and a private water company. The water company has been in operation about a year. A great many have taken the water, and more are making connections. The basin or pond is about a mile out of the town, and is pure spring-water. All overflow from rains is conducted around the pond. The pipes are cleaned by opening the fire-plugs. The number using wells and cisterns, I cannot answer.

There is no drainage, except the natural slope of the land. Cellars are mostly dry.

Houses have cellars, and most of the cellars have heaters in them. Cannot tell how many tenement-houses have more than two families, but do not think there are any. There is no yearly house-to-house inspection.

There are no sewers. Some cesspools are cemented and some are not.

There are no markets.

There has been no prevalent disease this year.

The slaughter-house is kept in good sanitary condition.

There are no manufactories.

The school-houses are well ventilated and are kept in good sanitary condition.

There is no alms-house or hospital.

There are three cemeteries or burial-grounds.

The laws regarding the public health are well looked after.

The registration of vital statistics the Assessor has charge of.

There has been no need of any quarantine, as there has been no contagious disease.

We have no sanitary expenses.

The houses are mostly heated by furnaces; some few have steam and are generally well ventilated.

The only prevalent disease was whooping-cough, which was very bad through the spring and summer. There were several deaths from it.

(Signed)

W. C. NICHOLSON,
Secretary.

STOCKTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Geo. Molineaux, Assessor, Cramer's Hill; Benj. Abbott, Cramer's Hill; Frank Horner, Merchantville; Chas. K. Seddenger, Cramer's Hill; Jerome Artz, M.D., Cramer's Hill. Benj. Abbott, Health Inspector.

Stockton township is located between Cooper's creek and Pensauken creek, the Delaware river on the north and Haddon avenue on the south. The population is between five and six thousand. Climate about the same as Camden city.

The soil is principally sandy, with the exception of the clay-pits near Fish House.

Water is supplied principally from wells, and some few from the water-main leading to Camden.

Drainage very poor; nothing but natural drainage.

The refuse, &c., is used in composting, and not allowed to accumulate.

The Board has been thoroughly organized.

We have had three cases of small-pox in one family. They were quarantined, the residence thoroughly fumigated, and every precau-

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tion taken to prevent the spread of the disease. The entire population were vaccinated four or five years ago. No spread.

The expenses this year were of course increased on account of the few cases of small-pox, &c.

We have had a very severe epidemic of acute dysentery, and a large number of malarial fever cases, but considering the increased number of inhabitants the health of the township has been remarkably good.

(Signed)

G. W. MOLINEAUX,

Assessor.

WINSLOW TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Josiah Alberton, Clerk, Waterford; H M Jewett, Winslow; E A Russell, Sicklerville, Zober Venton, Elm; M G Bardsall, Assessor, Wilton.

CAPE MAY COUNTY.

CAPE MAY CITY.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. H. Phillips, M D, President, W F Cassidy, Secretary; Geo. Foster, Jos. Hand, Wm Essen, Sr. Martin C. Swain, Health Inspector.

Our water-supply is obtained from surface wells about one mile inland and north from our city. It is generally used in our city and is owned by the city corporation. It is always clean, pure and soft. Has no taste. Very few families use well-water, and but two or three have cisterns.

Our sewerage and drainage are combined. We have adopted no particular system. Most of city has dry cellars. We have salt meadows, but very seldom have malarial troubles

Sewers are from eight inches to one foot in diameter. Cannot state the fall, but it is slight, and are emptied into tide-water inlets from the ocean.

We have no basements. Very many houses have cellars. There

has been no house-to-house inspection. Most of our houses are connected with sewers.

Cesspools are not cemented. Are emptied by carting the contents away in carts. Contents are used as fertilizer.

There has been no prevailing disease.

Hogs are not allowed to be kept within the limits of the corporation from May until October.

Slaughter-houses are not allowed within the corporation.

We have no manufactories.

(Signed)

E. H. PHILLIPS, M.D.,
President Board of Health.

DENNIS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John F. Goff, East Creek; E. W. James, Dennisville, Remington Corson, South Seaville, Morris Warwick, Dennisville, G. G. Carll, Township Physician, South Dennis.

During the month of August, complaint was made to the Board of Health, of a nuisance caused by the dumping of garbage and manure on the farms on the sea-shore, from Sea Isle City; the Board immediately gave notice for its abatement, and no further complaints have been made, the authorities of Sea Isle City having provided other means of relieving their city without placing it in this township.

There have been no contagious diseases or epidemics reported during the year. Malaria is very seldom known in our township. There are no stagnant ponds, there being a natural drainage toward the ocean and Delaware bay.

(Signed)

MORRIS WARWICK.

HOLLY BEACH CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edward Luna, President, Holly Beach, Martin L. Harrison, Secretary, Holly Beach, Edward Potts, Holly Beach, Theodore C. Brown, Holly Beach, William A. Lake, Holly Beach.

Holly Beach City is situated on what is known as the Five-Mile Beach, on the southeastern coast of New Jersey. The city itself is in

the center of the beach, and has an acreage of 400, with a permanent population of 450 inhabitants. Climate, mild.

The city is situated on a low, sandy stretch; one-half low and sandy, interspersed with sand-hills, the other half composed of marsh or meadow lands.

The water-supply is chiefly from cisterns and wells. Since the organization of this Board all wells have been closed, and cisterns, tanks and barrels used for drinking and culinary purposes, though there are five wells in use for cattle and washing.

The drainage is unsatisfactory, depending alone on surface drainage, with only one street with a trunk in. Water lies too near the surface for any cellar. Considerable swampy ground within the city, and mild cases of malaria prevalent in the autumn, though becoming less as fast as the low places are filled.

Too low for basements or cellars. House inspection yearly.

Have no cemented cesspools; all are provided with water-tight receptacles, which are emptied two or three times weekly, and contents composted outside the built-up portions of the borough, on the meadows. No sewers.

Have no slaughter-houses; contrary to our health laws. There is also a borough ordinance prohibiting the erection of any manufacturing establishment.

Have one school-house, capable of containing 100 scholars, the upper story of which is used as a public hall.

No alms-houses or hospitals; depend on the Overseer of the Poor to relieve such cases as come within his jurisdiction.

The police body composed of a Marshal. Have a lock-up containing two cells.

No fire-guards or escapes within the borough.

No cemeteries; all bodies interred on the mainland.

Have a code of ordinances adopted, and endeavor to have them enforced for the protection of the public health and improvement of the sanitary condition of the borough.

Keep no record of registration and vital statistics in this office.

Since the formation of this borough, have not had any contagious diseases within the limits, nor have we taken any quarantine measures. Have only had one case of an infectious nature, diphtheria, which we kept isolated and prevented attendance at school until notified by physician of a thorough recovery.

Sanitary expenses \$350 per year.

Heat for dwellings furnished by the ordinary coal and wood-stoves, and ventilation of dwellings, taken as a whole, satisfactory.

We have had no diseases at any time, with the exception of a few cases of chills and fever, and mostly occurring in the autumn, and one case of diphtheria of a mild type.

Will simply state that this being a new settlement, and having considerable drawbacks to contend against, our progress as a Health Board has not been as satisfactory as we would wish. Our main difficulty is in having so many places, as low lots, to fill, and lying too near the surface of the water for any kind of sewerage. But by our weekly removal of all excreta, and by our filling up of all low places, we keep the locality healthy.

LOWER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Stephen Weeks, Chairman, Cold Spring; Wm. C. Rutherford, Secretary, Cold Spring; Wm. C. Town, Cold Spring; Wm. L. Cummings, Fishing Creek.

We are glad to say that we have been very much favored with good health and have had no contagious diseases during the year. We think it has been an unusual year for good health generally. The Board has not been called out to abate any nuisances, and our inhabitants seem to take more interest in keeping all things pertaining to the welfare of health in a fair condition.

(Signed)

WM. C. RUTHERFORD,
Secretary.

MIDDLE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel E. Douglas, Cape May Court House; Townsend W. Garretson, Cape May Court House; Isaac M. Downs, M D, Cape May Court House; Thomas P. Erricson, Green Creek; Stillwell H. Townsend, Burleigh.

Water is obtained from open dug wells, driven wells and in a few cases from cisterns. The water in many of the dug wells is totally unfit for use. In all cases of driven wells the water tastes of iron.

Many cellars have water in them in the winter season. There are many swamps, but no cases of malaria have been reported.

About one-tenth of the houses have cellars, and they are largely used for the storage of vegetables. About eight houses have two families living in them. There is no yearly house-to-house inspection.

Cesspools generally have open bottoms; some are cemented and some are made of wood; the contents are generally used for manure.

A code of laws was passed by the Board last spring. But one case has been reported and the person immediately put a stop to the nuisance. The general health of the people of this township for the past year has been good. Late in the fall and early part of last winter a large number of horses died, but the disease has entirely ceased. No persons were reported for failing to comply with the law passed by the Board, which requires them to be buried three feet under the ground.

(Signed)

STILLWELL H. TOWNSEND,

Secretary.

OCEAN CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. Conner, Ocean City; B. Newkirk, Ocean City; H. C. Sutton, Ocean City; J. Steelman, Ocean City; J. S. Waggoner, M.D., Ocean City.

The health of Ocean City for the year ending, is the same as for the past two years—remarkably good; no malarial or prevailing diseases of any character.

Water-supply and drainage good. If we could induce council to join us in having water-closets cleaned by contract, our only trouble at present, would be overcome. We have an ordinance to prevent all cleaning during the summer months, but it requires considerable attention on our part, that they are attended to early in the season.

(Signed)

J. S. WAGGONER, M.D.,

President of Board.

UPPER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James G. Stille, Tuckahoe; Washington Van Gilder, Petersburg; Sylvanus Corson, Seaville; Washington V. Young, Salem. Randolph Marshall, M.D., Health Inspector.

The general health of the township for the past year has been remarkably good. No epidemics have visited us during the last year.

We have had but few deaths, and those mostly of elderly persons, from causes not dependent on want of proper sanitary regulations.

(Signed)

RANDOLPH MARSHALL, M.D.

CUMBERLAND COUNTY.

BRIDGETON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Chas. E. Sheppard, President ; C. B. Moore, Secretary ; Chas. E. Mulford, Eli Loper. M. W. Applegate, Health Inspector.

COMMERCIAL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Seth Bowen, Mauricetown ; Henry Mayhew, Mauricetown ; Samuel Shinn, Port Norris ; Samuel Butcher, M.D , Mauricetown ; Daniel T. Howell, Assessor, Maurice-town ; George E. Butcher, Town Clerk, Mauricetown.

During the past year the health of the township has been good, except mild malarial fever, which has prevailed and has been easily controlled.

The sanitary condition of the township is carefully looked after.

The water-supply is obtained from wells, from ten to thirty feet deep, which afford an abundant supply of pure and wholesome water.

The meadow and swamp land continues to be overflowed by tide-water, affording an over-supply of dampness in the air, but does not appear to produce any derangement of the general health.

The flatness of the country requires surface drainage.

The slaughter-houses are kept in excellent condition, and no offensive effluvia are allowed to exist.

There has been no prevailing disease amongst animals.

School facilities are kept up to an ordinary standard.

DEERFIELD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Elijah P. Parvin, Assessor, Deerfield; Dr. Charles C. Phillips, Deerfield; Phineas Hires, Deerfield; Joseph Golder, Deerfield; Edward S. Woodruff, Woodruff's Station.

The high position of the township, with its good drainage, and the agricultural pursuits of its inhabitants, prevent many diseases from having a foothold within its borders. Malaria is unknown, no endemics, and when epidemics occasionally make an appearance, they are generally mild in character, readily yielding to treatment. During the past year there has been little sickness, and that of a mild character, with very few deaths, except with aged people, who have been taken away by cardiac and cerebral diseases. No unusual sickness among children, with no visitation whatever of any eruptive epidemic, or of any other character, during the year.

(Signed)

DR. CHARLES C. PHILLIPS.

DOWNE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Leonard H. Chance, Clerk; George Chance, Assessor; Andrew P. Glanden, M.D., E. D. Fleetwood, Jos. C. Bradford.

The township is low, with poor surface drainage.

Water-supply good.

Refuse or excreta is carried out and turned under for fertilizer.

Slaughter-houses are generally well kept.

Health is looked after by the Board of Health.

Registration is carried out according to law.

Some intermittent fever the past year.

(Signed)

LEONARD H. CHANCE.

FAIRFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Mark S. Westcott, Geo. S. Whitecar, E. O. Davis; Harris Ogden, Assessor, Fairton. J. C. Applegate, M.D., Health Inspector.

The location of our town is such that we have good natural drainage into the Cohansey river.

Out-houses are generally disinfected and excreta utilized as fertilizer beyond the town limits.

Public grounds and highways are kept in good condition.

Schools are graded and ventilation good.

The laws regarding vaccination are generally observed.

Perhaps one of the largest beef and pork packing establishments in South Jersey is located about one-fourth of a mile from the town, but the slaughter-house in connection therewith is kept in good condition, and as yet we have been unable to trace any disease as originating from it.

During the past year a glass manufactory has been established here, giving employment to about fifty persons, but is located so as not to impair the health of the community in the least.

Our atmosphere is very dense and heavy, composed of salt and fresh air; hence we have various throat affections, otherwise the sickness during the year has been general. We have had no epidemics with man or beast.

Three-fourths of the deaths we have had have been from long-standing kidney affections, due, in my opinion, to the continued use of remedies of which they knew nothing, save the good things the advertiser has said. It may have been years ago that this destructive work of these organs was commenced, but, encouraged by the stimulating ingredient therein, they have gone too far, and, finally, appeal to us, giving us employment night and day, but not desirable by any means, because the atrophic work has already commenced. We have had some isolated typhoid fever, but generally of a mild type, the fever having been mostly of malarial origin.

(Signed)

J. C. APPLGATE, M.D.,

Inspector.

GREENWICH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel R. Mills, Chairman, Greenwich; Samuel P. Fithian, Secretary, Greenwich; William P. Test, Greenwich; Samuel M. Watson, Greenwich.

The Board met in the early spring and organized, but as there was nothing brought before them or came under their observation to be

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acted upon, therefore there has been no business for the Board to do. We have had no epidemics this year, neither among the people nor animals.

HOPEWELL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

M. M. Johnson, Seeley ; James F. Glaspey, Bridgeton ; Cornelius Sharp, Bridgeton.

LANDIS TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Theo. Foote, M.D., Chairman, Vineland; Geo. Davidson, Secretary, Vineland; J. D. Eilenberg, Vineland; Jas. Chance, Vineland; W. W. Whiting, Vineland.

We have nothing new to report. Our township is very healthful, and the Board is determined, if possible, to keep it so. We have not had a Health Inspector this year.

(Signed)

GEO. DAVIDSON,
Secretary.

LAWRENCE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Robert Howell, Cedarville; Ephraim Bateman, M D , Cedarville; Henry S. Garrison, Cedarville; E. T. Blackwell, M.D., Cedarville.

Conditions favoring good health have obtained in this district. No local cause of ill health has been brought to the attention of the Local Board, and no disease has become epidemic.

The drainage of the streets and drive-ways has been exceptionally good.

Refuse and excreta have been so managed as not to attract public attention.

Few animals are slaughtered within the precinct, the butchers' meat placed on sale being mostly derived from without.

The canning of tomatoes, which is carried on extensively, is managed without discomfort or detriment to the community.

Of houses and their tenancy there is no cause of complaint.

There has been no disease among animals.

There have been few burials in the district, such interments being discouraged by the Board. The depth of graves, according to observation and reports, is deemed satisfactory.

School buildings are in good sanitary condition, and intelligent attention is given to warming and ventilation. No call has been made by the school authorities for the vaccination of any pupil, and vaccination is generally neglected.

The registration of vital statistics has been properly attended to. No expense has been incurred by the Board.

(Signed)

ENOS T. BLACKWELL, M.D.

MILLVILLE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John N. Branin, T. C. Wheaton, Samuel Miskelley, Edwin Conover, L. H. Hogate, Richard Radcliffe. John Hartman, Health Inspector.

Millville is a flourishing city of nearly 10,000 inhabitants, lighted by electricity and furnished with good water by the Millville Water Company. The majority of citizens, however, have their water-supply drawn from wells on the premises.

The city has no system of drainage other than surface drainage, and this fact causes much annoyance and inconvenience to the City Council. About \$5,000 are annually expended on roads and streets, attention being given to grades, to carry off refuse and foul water.

There are no sewers here, each house having a cesspool, a small number of which are cemented. The cleaning of these is governed by ordinance of City Council and Board of Health.

No prevalent diseases but diphtheria have molested us this year.

There are several slaughter-houses in the city, but they are carefully conducted.

Taking all things into account, Millville has no cause for complaint in the health line.

(Signed)

L. H. HOGATE.

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STOE CREEK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles B. Bowers, Chairman, Shiloh; Edward N. Sheppard, Roadstown; David Ogden, Greenwich; Dr. Joseph Tomlinson, Physician, Roadstown; Ephraim Mulford, Assessor, Roadstown.

On looking over the schedule of subjects, I find nothing of interest but what has already been reported. Our physician knew of nothing in his practice that he deemed essential to mention.

As a rule, the physicians are prompt in making their returns.

ESSEX COUNTY.

BELLEVILLE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Daniel M. Skinner, Medical Member, President, Belleville; John H. Eastwood, Belleville; Charles H. K. Smith, Belleville; Charles Couse, Belleville; Richard P. Scaine, Belleville; George T. Casebolt, Belleville; William Connolly, Assessor, Belleville.

There is nothing of importance to add to former reports. A thorough inspection has been made of the town and many nuisances abated.

(Signed)

D. M. SKINNER, M.D.

BLOOMFIELD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas Oakes, President, Bloomfield; Reuben W. Dodd, Bloomfield; Geo. W. Cook, Bloomfield; Walter S. Freeman, Bloomfield; Stan. Farrand, Bloomfield; J. Edward Stubbart, M.D., Bloomfield. Samuel F. Baxter, Secretary and Health Inspector, Bloomfield.

During the past year the health of Bloomfield township has been exceptionally good. There has been no epidemic, and of contagious diseases there have been only a few sporadic cases.

Under the new law adopted by the Health Board, nuisances are promptly abated as soon as reported, and the hygienic condition of the township is thus kept up to the highest point of excellence.

(Signed)

J. EDWARD STUBBERT, M.D.

CALDWELL.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. E. Peck, M.D., President, Caldwell George C. Burnett, Secretary, Caldwell; Stephen Van Orden, Caldwell; Geo. M. Canfield, Caldwell; James K. Bush, Caldwell; Frank C. Goble, Verona; Henry V. N. Jacobus, Cedar Grove.

Our township is the most northerly in the county, being bounded on the north and west by the Passaic river. That portion being extremely low, floods in seasons of heavy rainfalls, while the south and eastern are hilly and mountainous.

The people of the township are the occupants of small homesteads and are agricultural in their pursuits.

The water is procured from wells, mainly, though flowing springs abound, and the quality of the water is good.

The houses are generally small and serve for one family. There are no slaughter-houses or manufactories among us, giving offense. The school-houses are eligibly located and care to health and comfort is observed. The inhabitants of the township are observant of the laws of health, and there has been no undue sickness among us.

Dairy farming is one of the principal industries and many cows are kept, but I have yet to hear of any kind of disease affecting them.

(Signed)

GEO. C. BURNETT.

CLINTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob W. Fisher, President, Waverly Park; W. H. Goldsmith, Secretary, Lyons Farms; James H. Mortland, Irvington; John Medcraft, Irvington; Louis E. Voorhees, Irvington; Abram Voorhees, Irvington. M. Osborne Christian, M.D., Health Inspector, Irvington.

The township of Clinton is located to the west of and adjoining the city of Newark, with an arm extending east into the Newark

meadows, and lying between Newark, on the north, and Elizabeth, on the south. A large portion of the township is incorporated as the village of Irvington and has a separate Local Board of Health. Population, including village, about 2,900. Village, about 1,800.

The topography of the township is rolling, with water-shed from east and west toward the Elizabeth river, an inconsiderable stream which flows from north to south centrally through the main part of the township. The eastern arm being mostly salt meadow and low land, has drainage through Bound creek, a tide-water stream emptying into Newark bay.

The water-supply is mainly from wells, usually extending several feet into the rock, and is generally of good quality.

There is no regular system of drainage adopted, but cellars are usually dry and in good condition. There is a swampy section in the northeastern part of the township, which was drained several years ago by a drainage commission.

Houses generally have cellars, not largely used for storage of vegetables. A few have occupied basements; these are mostly in the village. There are probably not more than a dozen houses in the township outside the village having a plural tenancy. There is no house-to-house inspection.

There is no regulation of cesspool construction outside the village.

There have been no outbreaks of contagious diseases among animals during the year.

School buildings are in good hygienic condition, with enforced vaccinations and absence of children from houses containing infectious diseases.

There are two cemeteries, or burial-places, in the township—Clinton cemetery, in the village and upon the banks of Elizabeth river, and Newark potter's field, down in the salt meadow section.

With the exception of a very few malignant cases of diphtheria last March, there have been no diseases prevalent, and the general health of the township for the year has been better than the average.

The principal source of annoyance has been the desire of a few farmers to have dead horses and night-soil deposited on their land, a matter in which a few are very persistent.

(Signed)

M. OSBORNE CHRISTIAN, M.D.

EAST ORANGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. H. Wiley, Chairman, East Orange; T. R. Chambers, M.D., Secretary, East Orange; G. E. P. Howard, East Orange; A. H. Ryan, East Orange; F. A. Nott, East Orange; T. E. Vermilye, East Orange; David Wilson, East Orange; Richard Coyne, East Orange; J. F. Smith, East Orange; N. M. Culberson; East Orange; E. W. Cowdrey, Assessor, East Orange.

According to last census, the population was over 12,000.

The past summer has been unusually cool and the number of rainy days more than the average.

The immense dug wells which have now been in use over two years continue to give the highest satisfaction; the water is pure and the supply more than the demand for household and fire purposes.

A portion of the township is being drained, under commissioners, and there are several other parts of the township needing drainage. One area in the central and southern portion is under consideration at the present time, the growth of the neighborhood demanding that something shall be done without delay. The cesspool nuisance is abating, for when complaint is found the health officer recommends connecting with the sewer system. The sewer system, which was reported as under way last year, is practically completed. Considerable water leaks into it, but not sufficient to interfere with its working, which is thus far eminently successful. Four hundred connections have been made. Many skeptical parties fail to join the system, who really would be greatly benefited by it. They predict its failure, but the officers in charge and others versed in such matters are very sanguine.

Many new streets have been macadamized, lighted and have sewer and water-pipes, since last report.

The new houses are generally of \$4,000 to \$6,000 type, though many cheaper ones have been erected, and find tenants ready to occupy them.

The township provides a public scavenger, who removes the garbage from barrels placed on the sidewalk in front of houses. The material thus gathered is carted to the poor-farm and dumped. Cesspool matter, which is gathered by private individuals, is dumped into trenches properly dug in unoccupied land, and an abundance of lime

and copperas is employed, all under the supervision of the Ordinance Committee of the Town Committee.

The schools have become so crowded that two buildings have been made very much larger, and still their growth again is only a matter of a few years. The subject of a Board of Education for the town, and the construction of a high school for the whole town, is under earnest consideration. This would relieve the present buildings of their crowded condition and divide the expense of a new building between the four wards. An industrial department is becoming a feature of all the schools, and some excellent work has already been done.

The police force has been increased and numbers thirteen patrol, two roundsmen, two Sergeants and the Chief—eighteen in all.

Precautions for fire are very nearly perfect, as far as they may be with a volunteer company. There are five hose companies and one hook and ladder. The latter is drawn by horses. Two substantial brick buildings and the Gamewell fire-alarm service give the town a well-equipped service. Besides, the companies are enthusiastic and have done good work, their services having been required, unfortunately, about twice a month, on an average.

There seems to be room for improvement in the management of the two R. C. cemeteries in our township. With the new code to be adopted when the Legislature shall grant the privileges desired, now refused to townships, we expect to hold the cemeteries to a strict accounting for unsanitary business.

The expenses of the Board for 1888 will be about \$731.

(Signed)

T. R. CHAMBERS, M.D.,

Secretary.

FRANKLIN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

R. J. M. Chase, Franklin; James W. Sargent, Franklin; R. W. Booth, Franklin; Henry A. Connely, Franklin; William H. Banta, Franklin.

Located on branch of New York, Lake Erie and Western railroad, and is about two miles square.

Population about 2,000.

Streets in very fair shape.

Kerosene used for lighting.

The industries are the manufacture of hosiery and quarrying of stone.

The town is generally healthy, as the Board has had no occasion the past year to meet, and our one physician finds plenty of time to visit all the sick.

(Signed)

R. W. BOOTH,
Secretary.

LIVINGSTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Nelson Smith, Chairman, Livingston; George E. De Camp, Secretary, Roseland; Archibald Parkhurst, Livingston; Alson Walker, Roseland; Bern W. Dickerson, Chatham; Frank Meeker, Livingston.

The health of the township has been good. No contagious diseases have visited us. There has been an increase of malarial fever over last year, caused by the overflow of the Passaic river; the low meadows being under water the most of the summer.

(Signed)

GEORGE E. DE CAMP.

MILLBURN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William M. Deen, Chairman, Short Hills; Wesley R. Ayres, Millburn; E. B. Renwick, Millburn; Benj. F. Lord, Millburn; Samuel B. Passills, Millburn; Wellington Campbell, Physician, Short Hills. Isaiah Williams, Secretary and Acting Health Inspector.

Population about 2,200.

Water-supply from wells and springs.

Drainage and sewerage mostly surface or cesspools.

Streets are not kept in utmost state of good repair, nor are public grounds.

Houses kept in fair repair.

Lighting is mostly by lamps.

Refuse mostly accumulates, and may be used as fertilizer or allowed to decay.

One or two good markets; several small dealers.

Have not heard of any diseases among animals.

No slaughter-houses, to my knowledge; butchers may slaughter a few calves or hogs.

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Two paper mills, one paste-board mill, two or three hat shops and several small hat shops.

Three public schools in township; some small private schools.

One town poor-house—four paupers; no hospital.

No police; two or three constables.

No fire-guards or escapes.

Two cemeteries.

No laws in regard to public health nor measures taken to abate nuisances, except upon complaint; must say there is very slight cause to complain.

Returns of vital statistics are made to Assessor, who forwards to State Board.

Has been no occasion for quarantine; has been no contagious disease of any moment; ordinary vaccination is attended to by physicians.

Heating mostly by stoves and furnaces; some few houses by steam.

There has not been any marked increase in any one form of disease; have been no epidemics; we are not apt to have them. During the past year we have enjoyed a very fair degree of healthfulness.

I am impressed by the fact that there have been but two complaints made, which were immediately acted upon, and the cause rectified.

(Signed)

W. CAMPBELL, JR., M.D.

NEWARK CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph E. Haynes, President, Newark; Alexander H. Johnson, Newark; Tyler Parmly, Newark; Henry R. Baker, Newark; Dr. F. B. Mandeville, Newark; Dr. Charles M. Zeh, Newark; Dr. Herman H. C. Herold, Newark; Samuel S. Sargeant, Newark; Wm. B. Guild, Jr., Newark. David L. Wallace, M.D., Health Officer, Newark.

The work of constructing sewers through the streets of the city is progressing actively, a number of miles having been built during the past year.

Fifty thousand dollars per year is spent in repairing with oblong granite blocks, this having been done for the past five years, so that at present all our principal thoroughfares are paved with these blocks.

Up to the present time 14,283 houses have been inspected on the

house-to-house inspection method, and plans of the premises are on file in the office of the Board. In this inspection 2,397 nuisances have been found and 2,298 abated; 1,260 cases of defective plumbing have been found and 1,249 of these have been rectified.

The Sanitary Code mentioned as being under passage, in last year's report, became a law in due time. Five thousand copies have been printed for the use of our citizens, and the laws as contained therein are being strictly enforced, especially as to thorough inspection of animals, both alive and slaughtered, the closing of wells the water of which is unfit for potable use, the sanitary condition of dwellings and the care of contagious diseases. The Sanitary Committee of the Board of Health are about to consult with the Directors of the City Hospital and hope before long to have a wing of that institution devoted to the care of cases of those diseases in which isolation cannot be practiced at the homes of the patients. With this an accomplished fact, the controlling of these diseases will be an easy matter.

During the past year the returns of marriages and births have been better than in previous years, but it is not yet what it should be. The City Clerk and myself have just had a circular printed, calling the attention of physicians and ministers to the passage of the law of 1888 regulating the reporting of marriages, births and deaths. In it we have stated that it is mandatory in character and must be enforced. Instead of having these returns mailed to this office, they are called for each month by the Inspectors of the Board of Health, and we find that more returns are received in this way.

During the past year 26,764 head of cattle were inspected, 36,153 hogs, 69,245 sheep, 48,898 calves, or a total of 181,060. The following were condemned: Cattle (beef), 3; calves, 67; sheep, 42; hogs, 1. The following articles were condemned in markets: Poultry, 2,045 pounds; beef, 1,965 pounds; mutton, 803 pounds; pork, 500 pounds; bologna, 430 pounds; veal, 270 pounds; rabbits (number), 62; also a large quantity of fruit and vegetables.

The following gives a summary of all work accomplished in the Sanitary Department for the year 1888: Notices served for abatement of nuisances, 2,240; abatements, 2,010; notices served to rectify defective plumbing and drainage, 970; rectifications, 899; permits granted for sewer connections, 1,272; number of sewer drains inspected, 1,063; permits granted for cleaning vaults, 2,472; permits

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granted for cleaning cesspools, 626 ; permits granted for keeping cows and goats, 686 ; sunken lots filled, 10.

The officers and employes of the Board of Health are as follows : Health Officer, Superintendent of Force, one Milk Inspector, one Veterinary Inspector, one Meat and Vegetable Inspector, eight Sanitary Inspectors, City Apothecary and eight District Physicians.

(Signed) DAVID L. WALLACE, M.D.,
Health Officer.

SOUTH ORANGE BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edward Self, President, South Orange ; Isaiah Ball, Secretary, South Orange ; John A. Nugent, South Orange ; Arnold Tanzer, South Orange ; Henry Lilly, South Orange ; Noel Martin, South Orange. A. A. Ransom, Health Inspector, South Orange.

Located about the middle of county of Essex, New Jersey. Population, 3,000. Climate as it is in Newark.

We have two great water-sheds, underlaid with trap-rock.

Water-supply is from springs, wells and from Orange.

Drainage and sewerage are private.

The streets and public grounds are the best in the State.

The houses generally are good, and well attended to.

Gas and oil are the modes of lighting.

Refuse and excreta are received in vaults ; carried off by odorless company.

The markets are in good condition.

Have lost six or eight horses with cerebro-spinal meningitis, all in one barn, at Mountain House.

No slaughter-house in the village.

There is but one manufactory in the village.

Schools and school-houses are all in first-class condition.

There is no alms-house or hospital, but abound in other charities.

Police and prison are all right.

Where there is need of them, fire-guards or escapes are placed.

Have one cemetery. Burials by permit.

Our public health laws and regulations are sufficient and thoroughly executed.

Registration and vital statistics will, I think, be all right.

Contagious diseases and vaccination are thoroughly looked after.

Our sanitary expenses amount to about \$500.

Improvement is being made in supplying heat and ventilation for dwellings.

During the year we have had several cases of pneumonia and rheumatism. No epidemic.

The village of South Orange contains about three and one-half square miles. Four hundred dwelling-houses, mostly detached; four churches and five school-houses. The village is entirely free from debt.

(Signed)

A. A. RANSOM, M.D.,
Register of Vital Statistics.

WEST ORANGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edward P. Smith, President, Orange; John Otterbein, West Orange; John B. Van Wagenen, West Orange; Ephraim I. Jacobus, West Orange; Robert N. Drew, Orange Valley; Levi Van Buskirk, Orange Valley; Dr. B. L. Dodd, Orange.

Water-supply is from wells and cisterns.

Drainage and sewerage are natural.

About one-third of the houses have basement kitchens.

Those that have cesspools have them cemented.

There is but one slaughter-house, and that is kept in good condition.

Have phonograph works. No evil therefrom.

GLOUCESTER COUNTY.

CLAYTON BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

D. W. Moore, Chairman; G. M. Tomson, Secretary; H. G. Buckingham, M.D., Geo. W. Page, Alonzo Fisler, R. M. Warner, G. R. Heisler.

Unusually good health has prevailed in Clayton borough during the year. A very few cases of malarial fever and dysentery, of mild type, during the summer and autumn months.

A civil engineer has made a survey of the village. Some of the streets have been graded and better drainage is the result.

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A sanitary inspection has been made by the Board of Health, and when back yards, drains, &c., have been found to be uncleanly, the evil has been remedied.

The sanitary education of the people is improving.

(Signed)

H. G. BUCKINGHAM, M.D.,

Medical Inspector.

CLAYTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel F. Fisher, M.D., Clayton; Wm. A. Williamson, Clayton; Samuel C. Newkirk, Clayton; A. G. Silver, Clayton; John W. Gardner, Unionville.

DEPTFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. Stewart, Almonesson; Chas. Pierson, Woodbury; Wm. Stevenson, Salina; E. D. Riley, Assessor.

EAST GREENWICH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Benj. Heritage, Chairman, Mickleton; Walter Heritage, Mickleton; William H. Hoffman, Clarksboro; Henry L. Haines, Clarksboro.

Water-supply—wells.

Drainage—natural. Cellars generally dry.

Houses generally have cellars; not used for the storage of vegetables to any great extent. Tenement-houses of more than two families unknown. No inspection.

Cesspools open; emptied by shovel and used as fertilizer.

Assessor makes no inquiry as to losses of animals or contagious diseases.

No slaughter-houses.

No manufactories.

Returns not neglected to any extent.

School-houses are the ordinary country district school-houses.

Gloucester county alms-house, within township. No inspection by local authorities.

Police and prisons—none.

Eglington Cemetery within district. Incorporated under State laws.
No complaints.

Heat and ventilation—heat generally by ordinary coal-stove, occasionally by heater; source of ventilation by windows.

Local Board of Health not specially organized, but no nuisances complained of.

FRANKLIN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Trimnel, Malaga; Charles D. Smith, Franklinville; Samuel Lowder, Newfield; A. A. Smith, M.D., Malaga; Joshua C. Richman, Malaga.

We are purely local. Our population is not in a compact mass, but is spread out over 37,000 acres of land. No towns. Malaga, the largest village, about 500.

There are a few tenement-houses in Malaga, and no others in the township.

No sickness to speak of; a healthy district.

(Signed)

JOSHUA C. RICHMAN.

GLASSBORO TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. H. Beckett, Glassboro; John E. Pierce, Glassboro; H. Iszard, M.D., Glassboro.
T. C. Allen and Dr. J. Iszard, Health Inspectors.

The water-supply is from wells and of good quality.

We have a system of drainage to carry off surface-water during rain. No sewerage. Cellars mostly dry, except in very rainy weather.

The streets and public grounds are in good condition.

Houses all have cellars, mostly of fair size and plenty of light. The houses generally are well built. We have not established the yearly house-to-house inspection.

Refuse mostly fed up. Excreta mostly carted out of town in winter.

Slaughter-houses, with one exception, are out of town.

The manufacture of glass is the chief industry.

We elected Police Magistrate and two Marshals last spring.

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During the year a fire-escape has been placed on one of our public buildings.

One new cemetery is about being started out of town.

The public health laws and regulations are adhered to so far as understood.

Registration and vital statistics are sent in by the physicians of the township to the Assessor.

There have been a few cases of contagious diseases, which were kept isolated as far as possible. There has been no epidemic to require a general quarantine.

Prevalent diseases same as last year, with more scarlet fever and typhoid fever.

(Signed)

H. ISZARD, M.D.,
Secretary Board of Health.

GREENWICH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Ballinger, Paulsboro; E. G. Miller, Paulsboro; Joseph Devault, Paulsboro; Benjamin L. Fish, Gibbstown.

The supply of water is entirely from wells, which in the most populous parts of the township are from eight to ten feet deep. In wet times the water is sometimes discolored, being principally by surface-water. In some few cases there are driven wells. The water is generally soft.

Natural drainage.

Houses have cellars. Cellars are used to a considerable extent for storage of vegetables.

(Signed)

JACOB BAILLINGER,
Assessor, Paulsboro.

HARRISON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James White, Mullica Hill; E. E. De Grofft, Secretary, Mullica Hill; Wm. Bunning, Mullica Hill; J. G. Foster, Jefferson; Allen S. Clark, Ewan's Mills.

Our water-supply is principally from wells, although there are some families that are supplied from cisterns.

We have no need for any drainage system, as nature has made ample provision for that—the villages in our township are situated upon high ground, or a considerable distance above tide-water.

All of the houses have cellars, many of which are used for the storage of potatoes. There is no yearly house-to-house inspection.

Our cesspools are built with open sides, and the excreta are removed by horse and cart, and as a rule, buried in the earth, but occasionally used as a fertilizer.

The only disease among animals in this vicinity is hog cholera, which prevails, at times, to an alarming extent.

Our slaughter-houses this year are an improvement, in cleanliness, over former years.

Our school buildings, in reference to heat and ventilation, are in excellent sanitary condition.

At the last meeting of the Board of Health, it was decided not to publish any health ordinance at present, in consequence of a depleted township treasury.

The heating and ventilation of our dwellings are in accordance with sanitary requirements, and will compare favorably with any other township in the State.

The township has been remarkably free from any prevalent disease or epidemics.

(Signed)

E. E. DE GROFFT,
Secretary.

LOGAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas J. Gaskill, President, Bridgeport; S. B. Platt, Secretary, Bridgeport; Hance Helms, Bridgeport; John Kirby, Bridgeport; E. T. Oliphant, M.D., Bridgeport.

Water-supply entirely from wells; depth from fourteen to twenty-five feet. Very seldom discolored, and in shoal wells only, in time of heavy and continual rains. Cause supposed to be surface-water. Principally hard. Some few cisterns, and water used for washing purposes only.

No system of drainage other than drain-tile in low farm lands, and in some few cases ponds are drained into creeks and meadows, and from meadows into creeks and river by tide-sluices. Usual water-

level is such as to secure dry cellars, and there are few cases where water is or comes in cellars. There are large cedar swamps in the township, and some considerable tide-marsh and meadows. No malaria of any account.

Houses generally have cellars ; used some little for storage of vegetables, principally potatoes for family consumption. No tenement-houses for more than two families. No yearly house-to-house inspection.

No sewers. Cesspools and privies are generally built with open sides and bottom, but of late people are taking more care in building the same and are making them tight. Contents are taken out in winter and used largely for fertilizers.

No animal diseases prevalent this year. Assessor inquires as to losses of animals and as to contagious diseases.

Slaughter-house is not in very good condition, but there is some improvement from last year by having a tight floor.

No manufactures.

No public buildings other than school-houses, and they are in a good sanitary condition.

Cemeteries are located about half a mile from town, and are on high, dry land, and burials are about four and a half to five feet deep.

Returns of vital statistics are generally promptly made.

Local Board has had no occasion to quarantine or care for any contagious diseases or vaccinations, but under our organization we can control or isolate the same.

Heat for dwellings is principally by stoves in the rooms. No system of ventilation other than doors and windows.

No prevalent diseases during the year.

(Signed)

S. B. PLATT,
Secretary.

MONROE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John W. McClure, Secretary, Williamstown ; J. B. Sickler, Williamstown ; H. K. Buzbee, Williamstown ; David S. Champion, Medical Member, Williamstown ; L. M. Halsey, Williamstown.

MANTUA TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Sharp, Chairman ; J. Mason Tomlin, Secretary ; William C. Long, Mantua ; J. Leo. Eldridge. Dr. E. Z. Hillegass, Health Inspector, Mantua.

The people depend on wells for their supply of water, which is all that could be desired. It is hard.

We have no system of drainage. Cellars are dry. We have some few swamps, but malaria is not very frequent ; occasionally we meet with a few cases.

Our houses generally have cellars, and comparatively few are used for the storage of vegetables. We have no tenement-houses of more than two families. No yearly house-to-house inspection.

We have no sewerage. Our cesspools are built with open bottom, and the contents are carted away and buried in the soil.

We have had no prevalent diseases this year ; a few sporadic cases of typhoid fever in September. The Assessor inquires each year as to contagious diseases.

Our slaughter-house is inspected daily during the months of July and August, and it gave us considerable trouble the past summer.

What few manufactories there are, we have no trouble with.

Our schools and school-houses are in excellent order.

As to our alms-house, we have had no complaint.

Our cemeteries are well kept.

Our Township Board adopted a health ordinance, as directed in Circular No. LX., for the preservation of the public health.

SOUTH HARRISON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel F. Stanger, M.D., Secretary, Harrisonville ; George Horner, Harrisonville ; Nathan Wilkinson, Harrisonville ; Alfred Lippincott, Harrisonville ; Thomas Borton, Harrisonville.

Water-supply is obtained from wells and cisterns. It is hard, and during a part of the summer it is offensive and unfit for use. This summer, however, has been an exception to the rule, as our water has been pure and used for all purposes during the entire season. It is

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accounted for by the fact of our having numerous rains, thereby keeping our wells comparatively well filled, for it is when the springs are low that the water is foul.

During the heated term of July and August there was an unusual amount of bowel troubles, affecting all ages, but not of a very severe type, readily yielding to treatment; also several cases of scarlet fever. In the fall and early winter we had a number of cases of diphtheria and typhoid fever. There has not been as much malaria as during some previous years.

(Signed)

SAMUEL F. STANGER, M.D.,

Secretary.

WASHINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Wilkens, President, Turnerville; Chas. Nicholson, Secretary, Turnerville; Evan Davis, Huffville; Frank Allen, Huffville. Dr. C. B. Phillips, Medical Member of Health Board, Huffville.

The water-supply is by springs, dug wells and cisterns.

Drainage and sewerage are accomplished by nature.

Refuse and excreta are taken care of so as not to contaminate the air.

We had a few cases of scarlet fever in the spring, but not enough to amount to an epidemic, only one case resulting fatally; also an epidemic of influenza, with one death.

Our Local Board of Health met in July and passed several ordinances for the preservation of the public health.

(Signed)

DR. C. B. PHILLIPS.

WEST DEPTFORD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John C. Budd, Thoroughfare; Alonzo P. Rambo, Thoroughfare; Joseph A. Moore, Woodbury; Louis K. Wilkins, Thoroughfare.

WOOLWICH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Benjamin F. Buzby, Medical Member, Swedesboro; Charles P. Batten, Swedesboro; Howard V. Lock, Swedesboro; John Moore, Swedesboro; Daniel Lippincott, Swedesboro.

The entire township depends on wells for drinking and cooking purposes; about one-third use rain-water for cleaning.

Drainage the same as all small country towns. The drainage, as far as known, causes nothing wrong. Swamps are not near, and malaria has been less than usual during the past year.

All houses have cellars, with few exceptions. They are usually used for the storage of potatoes in small quantities, and fruits. No yearly house-to-house inspection.

Coal oil, excepting in four cases, is used for lighting.

Refuse is fed to pigs, and carted out of town, by those owning them, in country; always disposed of in a manner in accordance with good hygienic measures. Excreta are carted away and buried in all cases. The people of our township seem unusually particular in regard to all subjects under this head, and as a consequence there are no bad effects to note.

No diseases among animals this year to note.

We have one slaughter-house. It is attended to right and nothing needs correcting.

The school-houses are kept in accordance with the laws of the State. Nothing to note. The public halls and lodge-rooms need attention; the doors of all *open in*.

The burial of the dead is the same as all old country towns follow. I have never noted anything objectionable which could be attributed to them.

The Local Board of Health has adopted a code of regulations and recommendations, which will be carried out, if needed, in any case.

Registration and vital statistics are all attended to properly.

Contagious diseases are so uncommon here that nothing has been demanded, so far; but our Local Board have taken care to embody such precautionary measures in their code, that, should occasion demand, full and complete measures would be immediately taken to limit the contagion. Vaccination is not attended to; the people have

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nothing to excite their fear, and as a consequence it isn't deemed requisite.

Buildings heated by stoves, heaters and steam. Ventilation—scientific—doesn't exist.

The past year has been one of exceptionally good health. The winter and spring were attended by diseases usually occurring at these seasons, in the usual degree; the rest of year nothing at all to note.

HUDSON COUNTY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

L. J. Gordon, M.D., President of County Board; C. J. Rooney, Jr., Clerk.

Vigorous efforts have been made by this Board, in every direction properly within its province, for the betterment of the sanitary surroundings of the people during the past year.

A thorough examination of the various ill-smelling factories on the west bank of the Hackensack was made, and by the introduction of appliances for consuming noxious and unpleasant vapors much of the objection to these places has been removed.

The storing of an immense quantity of manure near the hog abattoir, by the New York Horse Manure Company, has been a cause for action by this Board. After much discussion and consultation, the papers and reports in the case have been placed before the grand jury, and the matter is under advisement by them.

Many sewers and receiving basins in Jersey City have been repaired and cleaned by the efforts of counsel.

A sewer has been completed in West Hoboken, and one is under contract in Town of Union. One was constructed in St. Paul's avenue, Jersey City, and another is in course of construction in Laidlaw avenue, Jersey City. These have been undertaken at the instance of the Board.

Much improvement has taken place in the dairies of the county, and on several occasions the action of the counsel, H. D. Winfield, Esq., has been necessary to remedy unwholesome conditions. A much better management now is the rule.

The reporting of contagious diseases by physicians is enforced, and

legal action in several cases has had the effect of securing prompter and more complete reports.

It is now requested that school principals notify the Board of any cases of contagious disease coming to their knowledge. In this way the opportunity will be afforded of keeping check upon the physicians as to unreported cases.

In the year October 1st, 1887, to October 1st, 1888, cases of contagious disease have been reported as follows: Scarlet fever, 930; diphtheria, 1,299; small-pox, 27.

	Diph- theria.	Scarlet Fever.	Small- Pox.
Jersey City.....	1,002	779	19
Hoboken.....	113	80	6
Bayonne	47	14	.....
Harrison	31	4	.....
Town of Union.....	40	26	.....
West Hoboken.....	41	16	.....
Guttenberg	2	.....	2
North Bergen	19	8	.....
Kearny	1	2	.....
Union Township	2	.....	.....
Weehawken	1	1	.....

Total for all cases, 2,256.

As to vital statistics, you are respectfully referred to the detailed reports sent to you monthly from this office, and to the original returns of deaths, &c.

The ordinances last adopted by this Board are also forwarded for your information, as is the report made to this Board for year 1887.

The Inspectors have attended, as usual, to complaints and cases of contagious disease. Schools have been notified to exclude children coming from infected houses. There has been much activity on the part of the Board to increase its effectiveness, and the results are quite manifest.

(Signed)

C. J. ROONEY, JR.,
Clerk.

WEST HOBOKEN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. H. Righter, Chairman, No. 29 Cliff street; Levi A. Farr, Clerk, No. 4 Union street; James White, No. 45 Malone street; John W. Tanner, Hoboken street; Frederick Steinhoff, Anne street; August A. Rich, Central avenue, near Mill street. Louis Michel, M.D., Health Inspector, Paterson avenue.

The town of West Hoboken is located about the center of Hudson county, 280 feet above the level of the sea. The population is over 9,000 inhabitants.

The land forms a superb plateau bordering the Palisades. The soil is rather rocky, the contour is about two and a half miles, one and a quarter miles in length and half a mile wide.

The water-supply is furnished now by the Hackensack Water Company. The water is very clear and pure. A great many have wells, the water of which is good, and some with a slight taste of iron. The wells are always kept in good condition and clean.

Every house has some drainage connected with the different natural water-courses. We are now constructing sewers, and in the course of another year the town will have regular and proper sewerage.

One street only is paved, the others are flagged and guttered, and we are constantly opening new ones. There is only one public ground. The new town hall, in course of erection, will be finished by next April.

A great many occupy their own houses, others contain from two to four families, and some tenement-houses have been built recently to accommodate a larger number.

Kerosene oil and gas, for both streets and houses, are in use for lighting purposes.

Refuse and excreta from privies and cesspools are removed by licensed scavengers, and garbage and ashes by carts, twice a week.

This summer, on account of pleuro-pneumonia amongst the cattle, an Inspector visited our town for that purpose, and a great many cattle were removed and disposed of by his order.

The principal manufactories are several large silk factories, employing a large number of men and girls. The factories are well ventilated, and the premises kept in good hygienic condition. All the factories are provided with fire-escapes.

We have quite a large brick public school building, and one frame building in course of construction. There are also two Catholic schools (parochial), one a brick structure, quite large, and a smaller one, frame. All of the above buildings are well ventilated and provided with adequate fire-escapes.

Our police force consists of six patrolmen for night duty, two for the day, and one Sergeant, all under control of a Chief, who is a

member of the Town Council. There is also a lock-up for the detention of offenders.

All dwellings are heated by stoves, few by furnaces, and all houses have proper ventilation.

The prevalent diseases of the year were scarlet fever, diphtheria, whooping-cough, intermittent and malarial fevers. During the winter whooping-cough, scarlet fever and diphtheria were epidemic, and fatal cases resulted from diphtheria and scarlet fever. Intermittent fever reigned early, almost all the spring and summer, on account of so much rainy weather. During the heated term we had very few cases of cholera infantum in comparison to the summer of 1887—consequently a less death-rate.

During our first year we received twenty-one complaints, mostly for overflowing privies, all of which were abated; numerous nuisances, consisting of bad drainage and foul cesspools, were also promptly abated. So far, we have had no recourse to law, as our notices were obeyed willingly.

(Signed)

LOUIS MICHEL, M.D.,
Health Inspector.

HUNTERDON COUNTY.

ALEXANDRIA TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John G. Bonnell, Pittstown; Jonathan Kugler, Frenchtown; David Phillips, Little York; Moses D. Knight, M.D., Little York; Jacob C. Hackett, Mount Pleasant.

We have been afflicted with no epidemics.

Our drainage is fair.

Our Local Board of Health is in good working order.

BETHLEHEM TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

T. T. Hoffman, Bloomsbury; David Alpaugh, Norton; Jos. Mayberry, Junction; Jos. Dalrymple, Pattenburg; J. F. Linaberry, M.D., Bloomsbury.

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In last year's report I gave you a general description not only of the places but of the surrounding country, together with its geological structure. I have but little of interest to report this year. The early part of the season was quite wet, followed by frequent rains during the summer months. And since fall set in, it has been very wet, so much so that many cellars have had from one to two and a half feet of water in them for weeks. The humidity of the atmosphere being kept up by the frequent rains has brought with it an increase of catarrhal and rheumatoid troubles scarcely ever seen at this season of the year, except under like atmospheric conditions. In our township there has been no outbreak of contagious disease amongst either animals or people.

CLINTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. W. E. Berkaw, Chairman, Annandale; Peter Rockafellar, Secretary, Lebanon; Charles Case, Hamden; N. W. Hoffman, Lebanon; John Knox, Lebanon.

About all we have to report is that the Board organized according to law, and that there has been but one complaint before them this year, that being in regard to the collecting of foul barley grain in and around Lebanon depot. The matter was referred to H. W. Doughty, real estate agent of said road. We received, as answer, that it would be attended to at once, but it is not permanently settled.

(Signed)

PETER ROCKAFELLAR,
Secretary.

DELAWARE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jos. C. Reading, Secretary, Sergeantsville; Joseph Servis, Sergeantsville; Edward Priest, Sergeantsville; Calvin Strimple, Rosemont; I. S. Cramer, M.D., Sergeantsville.

The past year has been healthy, and we are glad to be able to report that it has been remarkably free from epidemics of any kind.

We are without any system of drainage in the township. The supply of water in this township is mostly springs and wells.

Our school-houses throughout the township are in good order and well ventilated.

Our slaughter-houses are managed very well.

(Signed)

JOS. C. READING,
Secretary.

EAST AMWELL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jos. Van Marter, Reaville; Ira Higgins, Wertsville; Theodore Craft, Wertsville; Van Dorn Lucy, Ringoes; P. A. Young, M.D., Ringoes.

FRANKLIN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. J. Case, Chairman, Pittstown; E. B. Suydam, Quakertown; A. W. Emery, Sidney.

I don't see that I have anything to report. In townships like this the Board consists of the Township Committee, Assessor and one physician. I have called the committee's attention to the fact that we ought to organize more formally, and have sent them the laws concerning the same.

The health of the people in the township is good.

(Signed)

E. C. TRIMMER,
Assessor, Quakertown Post-office.

FRENCHTOWN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Frank T. Eggert, Frenchtown; Jacob C. Hawk, Frenchtown; S. B. Lyons, Frenchtown; W. C. Williams, M.D., Frenchtown; H. I. Srope, Frenchtown.

Location—on Delaware river, Hunterdon county. Population, 1,050.

Water supplied by wells, cisterns, Delaware river and creek.

No drainage except by street.

Mode of lighting—coal-oil lamps.

Refuse and excreta are carted away.

Two meat markets.

Two slaughter-houses.

Three wood-working establishments.

Four churches, one town hall, one school.

Police station, or lock-up, in town hall.

One fire-escape—A. P. Williams' building.

One cemetery.

Board of Health laws.

Dwellings are heated by stoves and heaters. Ventilation, ordinary.

(Signed)

PRESTON SMITH,

Town Clerk.

HIGH BRIDGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John R. Apgar; High Bridge; Owen Aller, High Bridge; W. C. Alpaugh, High Bridge; George M. Rinehart, Cokesbury; Stephen Apgar, Cokesbury.

Water supplied by wells. Slightly impregnated by iron. The water is fair to good.

Drainage and sewerage good.

The streets are kept fairly clean.

Very little building. The same as last report.

Mode of lighting, kerosene.

I gave you full account in my last report how refuse and excreta were managed.

We have no public health laws or regulations, except those suggested by the State Board of Health. We put them in force when necessary.

We have no quarantine. Very little vaccination.

Malaria, bronchitis and mumps, which were epidemic, were prevalent during the year, and dysentery in September. No deaths. The cases of dysentery could be traced to uncleanness around or about the houses in which the patients were.

KINGWOOD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Geo. W. Kugler, Tumble; Geo. W. Dalrymple, Baptisttown; Wm. G. Biggs, Kingwood; Geo. E. Dalrymple, Baptisttown; E. D. Leidy, M.D., Baptisttown.

There has been no prevalent disease in the township during the past year. The health has been good.

(Signed)

GEO. E. DALRYMPLE,
Secretary.

LAMBERTVILLE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Geo. H. Larison, President; Geo. M. Holcombe, Jr., Secretary; Gervas Ely, John C. Sine, H. B. Kitchin, Wm. Lyman, Jno. L. Coryell.

A private company supplies water to the city. About 200 families take water. In May, June, July, August and September, it is stagnant, and tastes and smells; but few then drink it. It is fair the other months. Three hundred and fifty families use cistern water. The stream for reservoir is one of the common brooks. Surface-water comes in from rains, fields, &c. For the best water to drink, nearly all go to wells.

Common drainage, dry cellars mainly.

Nearly all houses have cellars.

Cesspools are regularly cleaned. They are uncemented. Contents carted out of city.

No prevalent disease.

Slaughter-houses are out of town; no hogs allowed kept in city.

GEO. H. LARISON, M.D.

LEBANON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Hipp, Glen Gardner; Joseph Fritts, Glen Gardner; Robert Ribbans, Anthony.

Our water-supply is mostly by springs, and as a general rule, is excellent in quality.

Excreta are generally disposed of by burial, and very often are left to decompose on vacant lots.

There has not been any disease among animals, with the exception of cholera among fowls.

Our butchers are careful as to the refuse, and slaughter-houses are kept clean.

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Our school-houses are in good repair, and are as well built and ventilated as any in the State.

The past year has been healthy, with no epidemics.

(Signed)

A. S. BANGHART,

Assessor.

RABITAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Ewing, M.D., President, Flemington; And. J. Green, Secretary, Flemington; George W. Fulper, Flemington; Myles Cunningham, Flemington; Henry H. Anderson, Cherryville.

The drainage of about sixty houses, which emptied out in a part of the town where it became a nuisance, has been conducted to a distance from any residence, so as to be of no further danger. The distance is 900 feet, and the pipes used are terra-cotta, fifteen-inch and eighteen-inch. The drainage spreads over a field in shallow ditches, the distance from nearest residence being about 500 feet.

The slaughter-houses are inspected and kept in a sanitary condition.

There have been no prevalent diseases, no epidemics, and the general health of the township has been rather better than usual.

Our bills are not all in, but the expenses will not be more than one hundred dollars (\$100). The expenses are: Pay to an attorney, printing of the ordinances, printing of blanks, &c.

We have passed and had printed for distribution two hundred copies of the ordinances recommended by the State Board of Health.

Our water-supply is good and the water pure.

(Signed)

JOHN H. EWING, M.D.,

President.

READINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Peter S. Latourette, Pleasant Run; Wm. C. Van Doren, Centreville; Fisher Pidcock, White House Station; W. W. Pursell, M.D., White House Station; David Schomp, Assessor, Centreville.

It has been very healthy in our township during the last year. Our country is rolling; good natural drainage; good water; and the people seem to realize that cleanliness is important to health.

(Signed)

DAVID SCHOMP,
Assessor.

UNION TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. R. Robinson, Jutland; Jos. H. Exton, High Bridge; Isaac B. Case, Pattenburg; N. B. Bolien, M.D., Jutland; Morris Stockton, Assessor, Pattenburg.

Located in the northwestern part of New Jersey. Population about 1,200. Climate is temperate.

Geology, iron ore. Topography at Norton, N. J. The mines are not worked now.

Manufactory, one peach-basket factory. Trade, farmers.

Five schools, and five school-houses. No other public buildings.

Four cemeteries, and four burials.

Public health laws and regulations are well enforced.

Dwellings are well heated and well ventilated.

No prevalent disease during the year.

WEST AMWELL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John B. Drake, Lambertville; Edward M. Larue, Rocktown; Cornelius Dallas, Rocktown; Lemuel Phillips.

MERCER COUNTY.

EAST WINDSOR TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph W. Perrine, Hightstown; Levi C. Updyke, Hightstown; D. Hart Cunningham, Hightstown; W. D. Wear, Assessor, Hightstown; Dr. George E. Titus, medical member, Hightstown; Thos. F. Pearce, Sanitary Inspector for the Borough Board of Health, Hightstown.

EWING TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James B. Green, Wilburtha; George W. Kelly, Trenton; Hildreth M. Casper, Trenton; Geo. L. Howell, Assessor, Ewingville. No physician living in this township.

The water-supply is from wells; it is both hard and soft, and good.
Natural drainage.

The cellars of the houses are used largely for storing vegetables.

We have public health laws and regulations.

The township is very healthy.

HAMILTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. C. R. Hart, Trenton; Amos Cole, Yardville; Joshua Lee, Trenton; John Sykes, Assessor, Trenton.

The township has a poor-house, kept in good condition, and the inmates are well cared for.

The cemeteries are all kept in proper condition.

The Board of Health observe the statutes regarding their government.

Registration and vital statistics are properly attended to according to law.

The children are vaccinated, and precautions are taken against contagious diseases.

HIGHTSTOWN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas Mason, President, Hightstown; Thos. C. Pearce, Secretary, Hightstown; F. B. Budlong, Hightstown; George Y. Wood, Hightstown; Chas. Manlove, Hightstown. T. F. Pearce, Health Inspector.

Water-supply from wells.

Surface drainage.

Streets in fair condition.

Frame houses, mostly occupied by single families, very few having more than one family, and none over three families.

Refuse and excreta are burned up and carted away for manure, by night-soilers.

Markets are stores and corner groceries.

Two slaughter-houses in town, which are generally kept in good condition. Some complaints during summer.

There are two shirt factories, one laundry, one straw cover factory, two cigar factories, two iron foundries, one sash and blind mill, one canning factory, all in good condition. No complaints.

Peddie Institute, Home Seminary and public school. Some complaint as to the sewerage of Peddie Institute, which flows into the mill-pond at the side of the town, where ice is procured for general use.

The cemetery is a quarter of a mile from the built-up part of the town, on an elevation.

Public health laws and regulations are made by this Board by ordinance.

All vital statistics are forwarded to the State Board of Health by the Borough Clerk, and no record kept here.

Have had no quarantine, no contagious diseases, and vaccination is general.

Sanitary expenses raised by tax.

Dwellings are heated by stoves and steam heaters. Ventilation as usual in small towns.

The town has been very healthy.

(Signed)

• THOMAS C. PEARCE.

HOPEWELL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Fleming, Pennington; S. A. Wear, Hopewell; Wesley Case, Lambertville; J. C. Harrison, Hopewell; E. L. Welling, M.D., Pennington.

Nothing special to report this year.

(Signed)

J. C. HARRISON,

Assessor.

LAWRENCE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph Slack, President, Trenton; Isaac D. Baker, Secretary, Lawrence Station;
James G. Phillips, Trenton; Samuel Hunt, Lawrenceville.

Water-supply, wells.

Drainage and sewerage. Some at Lawrenceville.

One case of typhoid fever.

PRINCETON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. J. H. Wikoff, President, Princeton; Jas. R. Drake, Secretary, Princeton; Dr.
E. H. Bergen, Princeton; Prof. H. B. Cornwall, Princeton; A. L. Rowland, Prince-
ton; Jas. Van Deventer, Princeton. Jas. K. Brown, Health Inspector, Princeton.

The questions have all been answered in former reports, from which
there is no change worth mentioning.

(Signed)

JAS. R. DRAKE,
Secretary.

TRENTON CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

G. D. W. Vroom, President; William Cloke, Secretary; Thomas S. Chambers, Dr.
Cornelius Shepherd, William Hewitt, Joseph T. Ridgway, Lawrence Farrell.

The operations of the Trenton Board of Health during the past
year have been fairly satisfactory, and productive of some excellent
results. The sanitary condition of the city has been uniformly good,
and the public health well maintained. Since my last report, the
Board has adopted a new Health Code. It was prepared with great
care by James Buchanan, Esq., the solicitor of the Board, and a com-
mittee appointed for the purpose. It is based upon the general act
of 1887, takes up *seriatim* the subjects therein placed under the juris-
diction of Local Boards, and exhausts the powers thus conferred. It
has been pronounced by competent authority the model Health Code
for cities of this State.

Within the past months the portion of the general system of sewerage for Trenton that was undertaken has been completed, and will be opened to public use as soon as it has been formally accepted by Common Council. It covers most of the densely-populated central and business parts of the city. Still further extensions of the system will undoubtedly be made, however, next spring and summer.

Since last year the Board has found it necessary, by reason of the large increase of its jurisdiction and duties produced by the annexation of Chambersburg and Millham, to appoint an Assistant Health Inspector. It selected as such official the Health Officer of the late borough of Chambersburg, Mr. James H. Tindall.

The following extract from the annual report of Health Inspector McGuire, lately submitted, will give such other information in regard to the work of the Board during the past year as you need :

“The city has been free from epidemics during the past year, and the general health has compared favorably with the preceding year.

“There have been reported at this office twenty cases of diphtheria, nineteen cases of typhoid fever, one case of varioloid, one case of scarlatina, and one case of enteric fever, by the attending physicians.

“I am compelled to make the usual complaint of physicians failing to report all the cases of contagious diseases coming under their charge ; also of undertakers failing to report all deaths from contagious diseases.

“I have received at this office 795 complaints of nuisances ; have served 652 notices by mail, and 173 personally ; have issued 1,175 scavenger permits, and have made 1,234 house-to-house inspections.

“During the year I have made numerous inspections of the city alms-house, and have always found the interior of the building in good sanitary condition, the rooms being light, cheerful, well ventilated and clean, and the inmates of this institution are well supplied with good, wholesome food.

“I frequently visit the county jail and the State Prison, and always find them in excellent sanitary condition, with the exception of their being overcrowded.

“In visiting our public schools I find the system of ventilation totally inadequate.

“I have frequently visited our city markets and find the food-supply most excellent and the buildings kept in as good a sanitary condition as can be expected without a system of sewerage.

“I have made frequent inspections of the milk-supply of the city, and am glad to report that during the year there have been no prosecutions for selling adulterated milk, and in this respect Trenton shows a better report than any other city of its size in our State.

“Oleomargarine and spurious butters have been driven out of the

markets owing to the vigorous measures of the State Dairy Commissioner. In my food inspections among grocers, I am informed that while they desire to sell pure goods they are often imposed upon by parties selling them impure goods. I have taken a number of samples of lard, and the result is that while every sample taken from our own city manufacturers has been found to be pure, two-thirds of all that is sold by retail grocers was found to be adulterated. This is known as Western lard.

"I have communicated with Dr. William K. Newton, the State Dairy Commissioner, and he informs me that prompt action will be taken to protect our merchants against these deceptions.

"The water-supply is very good. Forty wells of impure water have been abandoned and city water put in."

The Board holds meetings every fortnight with considerable regularity, and the members of the Board are prompt, faithful and intelligent in the discharge of their duties.

(Signed)

WILLIAM CLOKE,
Secretary.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Coleman, Chairman, Windsor; Forman Hutchinson, Windsor; Harrison Yard, Robbinsville; Dr. Geo. H. Franklin, Windsor; John B. Yard, Assessor.

The general health of Washington township never was better. There is very little sickness at present, and the township has been very healthy the past year.

(Signed)

JOHN B. YARD.

WEST WINDSOR TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph H. Grover, Princeton Junction; Jacob R. Wickoff, Dutch Neck; William J. Tindall, Edinburg; Liscomb T. Robinson, Dutch Neck; S. Judson Allen, Lawrence Station.

We have no contagious diseases. Inhabitants generally healthy.

MIDDLESEX COUNTY.

CRANBURY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

A. S. Mason, Cranbury ; A. S. Stults, Cranbury ; J. S. Stults, Cranbury ; Dr. A. H. Symmes, Cranbury ; S. J. Chamberlin, Assessor, Cranbury.

Nothing of importance to report. Everything seems to be in accordance with the law. No prevalent diseases. Health generally very good the whole year.

(Signed)

S. J. CHAMBERLIN,
Assessor.

EAST BRUNSWICK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John O. Cozzens, Spottswood ; John H. Perdun, Milltown ; Conrad Kohlhepp, Milltown ; Benjamin Peterson, Assessor, South River ; John C. Thompson, M.D., South River ; Stephen M. Disbrow, M.D., Old Bridge.

The township of East Brunswick is the central township of Middlesex county, bounded northerly by the Raritan river, easterly by the South river, southerly by South river, Monroe township and Manalapan brook, westerly by South Brunswick township and Lawrence brook. The population has increased steadily since 1885, but it is impossible to state exactly what it is.

Water is supplied by wells and cisterns. As this is mostly a farming community there is no uniform system of drainage.

The houses are generally frame, and are mostly occupied by their owners. The cellars on the farms are generally used for dairy purposes and storage of vegetables.

The town of Washington, population about 1,500, is within the limits of the township. There is no organized Board of Health for the town. In the town of Washington there is a manufactory for making handkerchiefs, shirts, &c. ; also five brick-yards for making common brick.

The Borough Commission of Helmetta was formed and incorporated last spring. It contains about 200 acres, and is situate within

the limits of East Brunswick township. The dwellings are mostly owned by the George W. Helme Company, and occupied by their employes, who are employed in the manufacture of snuff and tobacco. Population, about 250.

There are 7 public school-houses in the township of East Brunswick. They are mostly well built and in good condition.

The town of Washington has a public hall and lock-up for persons offending the ordinances of the town. It has Marshals to enforce order and keep the peace.

(Signed)

BENJAMIN PETERSON,

Assessor.

MONROE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel Buthen, Hightstown; Wm. Redmond, Jamesburg; John Lewis, Jamesburg; Chas. T. Hoffman, Assessor, Jamesburg.

NEW BRUNSWICK.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry R. Baldwin, M.D., President; Chas. H. Voorhees, M.D., H. Brewster Willis, Peter S. Austen, Ph.D., P. A. Shannon, M.D.; Henry B. Cook, City Clerk. A. Van Nest Baldwin, M.D., Secretary and Inspector.

The water is supplied by public works. The water has been as good as usual during the year. It is sometimes discolored by vegetable matter, which is greatest during the months of July, August and September. The reservoirs and pipes are cleaned by flushing as often as necessary. The stream which feeds the pond from which the water is taken is inspected by the Water Commissioners. There is no sewerage entering into the stream or pond. The water is very generally distributed over the city, and comparatively few wells and cisterns are used.

There is no system of drainage distinct from sewers, save such as is afforded by the drains from cellars and that secured by cesspools.

The water-level in the lower streets is so high that almost all cellars are damp and unhealthy. No swamps exist in the city limits, and there is no marked prevalence of malaria.

The sewers where placed are for the most part adequate; still, instances of overflow and inundation of dwellings have occurred. The houses of the city, for the most part, have cellars, and many basements are used as rooms for living.

The tenement-houses, for the greater part, are in fairly good condition. Where the city is sewerred, more than one-half the houses are connected therewith.

The cesspools are mostly made with open sides and bottoms, and, when full, are emptied by the scavengers. The contents, as well as that from privies, are taken out of the city limits for purposes of fertilization.

No disease can be said to have existed as an epidemic, and yet we have to record as many as forty deaths from diphtheria in our twenty thousand population, and this does not include twenty-eight deaths from what is reported as membranous croup. The Board regrets to state that there have been a great deal of neglect and carelessness in the reports of contagious diseases. The Board now has a method for the permanent recording of these diseases, and if in the future the returns be made promptly, considerable can be done to prevent the income of an epidemic and valuable statistics can be compiled. The Board has given public notice to the effect that a continuance of this neglect will not be overlooked, but the penalty will be enforced.

The keepers of our cemeteries and burial-grounds, with the exception of one, do not demand a burial permit, and in consequence the undertakers are negligent in obtaining them. The Board has notified them of the recent law and with the penalty for non-compliance therewith.

The Board of Health wish to acknowledge the interest shown on the part of Common Council in the work of the Board, and to express their thanks to that body in the appointment of a committee of conference.

(Signed)

A. VAN NEST BALDWIN,

Secretary.

NORTH BRUNSWICK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John A. Wines, Milltown; Philip Kuhlthan, Milltown; H. E. B. Dennison, New Brunswick; John N. Bodine, Franklin Park.

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The water-supply is from wells, and is both hard and soft, and from some of the wells has an iron taste. None receive their drinking-water from cisterns.

As a general thing the houses have basements or cellars, which are used in the winter for storage.

The Assessor made inquiry as to losses of animals, and to contagious diseases, and found none.

Slaughter-houses were found in a bad state, and notice was given to have the same taken better care of.

PISCATAWAY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Warren Smalley, New Brunswick; Alvah Gray, Dunellen; Firman Walker, New Market; A. S. Coriell, Assessor, New Market; W. J. Nelson, M.D.

There is nothing of importance to report this year, as we have had no unusual amount of sickness, no epidemics, and there has been no changes in drainage or water-supply or modes of lighting, &c. The only change is the erection of a new public school building.

(Signed)

W. J. NELSON, M.D.

RARITAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Luther H. Tappen, Chairman, Metuchen; Theo. A. Wood, Secretary, Metuchen; Samuel Laforge, Metuchen; Alfred Mundy, Metuchen.

There is nothing new to report from this township.

(Signed)

THEO. A. WOOD,
Secretary.

SAYREVILLE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. W. Fisher, Secretary, Sayreville; Wm. F. Fisher, South River; M. S. Higbee, South Amboy; Michael Salmon, Sayreville; J. H. Beekman, M.D., Sayreville.

Location is good; bounded on the west by the South river, on the north by the Raritan river, on the south by the Pennsylvania rail-

road, while the east verges to a point on the Amboy bay, with a railroad running through the center, from east to west. Climate, healthy. Population, about 3,000.

Country undulating, consisting of sand hills and clay hills, underlaid with clays suitable for terra-cotta, pottery, brick, tile, &c.

Abundant springs and very good in some portions. Under clays the water contains alum, magnesia, iron and lime.

The Town Committee organized as a Board of Health in October, 1888. Heretofore there has been no regulation as to health or anything in that line.

Registration and vital statistics are given through the Assessor. Ministers, physicians, undertakers and midwives fail to render them complete, and all through a lack of interest in such matters. I have written to them and also sent each one a copy of the law.

So far as cattle and horse diseases are concerned, they have been looked after by the State Board of Health.

Vaccination has been neglected, and in case of an epidemic there are no provisions made.

Malaria exists here, not among the older inhabitants, but principally among new-comers.

(Signed)

C. W. FISHER,

Secretary.

SOUTH AMBOY BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Bernard Roddy, President, South Amboy; W. C. Perrine, South Amboy; Cornelius McGonigle, South Amboy; F. E. Degraw, South Amboy; P. Campion, South Amboy; I. Mulholland, South Amboy; J. Scully, South Amboy. G. Cheeseman, Health Inspector.

The township of South Amboy, now a borough, has 700 acres.

The borough has no sewers, but the ground has a regular descent to the bay.

Very little malaria.

Streets in good condition.

Houses generally have cellars or basements.

About 100 houses occupied by two families.

No sewers.

No prevailing disease the past year.

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Slaughter-houses in good condition.

Vital returns well attended to.

(Signed)

A. V. APPLEGATE,
Assessor.

SOUTH BRUNSWICK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. S. Bennett, Jamesburg; H. E. Hathaway, Kingston; W. W. Cozzens, Dean's Station; F. G. Stevenson, Assessor, Dayton.

WOODBIDGE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Ephraim Cutter, President, Woodbridge; Samuel P. Harned, M.D., Woodbridge; Isaac Inalee, Woodbridge; Bernard Dunigan, Woodbridge; John Lockwood, Woodbridge.

Location, Middlesex county; population, 4,300; climate healthful, and, being near the ocean, the air abounds with humidity.

The water-supply is from wells and cisterns. At Lewaun a large well supplies the village.

No sewers, and surface drainage. Much low land near the town. Many cellars are wet in a certain part of the town, near what is known as Edgar's brook.

Houses generally have basements or cellars. In the country cellars are largely used for the storage of vegetables. In the town not many basements are used as dwellings. Twenty tenement-houses with more than two families. No house-to-house inspection. The Board has no Inspector.

Cesspools are used, many with open bottoms. Emptied by day laborers. Contents used by the farmers for fertilizers.

No prevalent diseases.

Seven public schools, all in good condition. The Woodbridge High School has about 500 pupils.

One poor-house, located on a farm at a distance from the town.

There is a lock-up in which prisoners are temporarily confined.

Four cemeteries, which are in good condition.

The public health laws of the township are those adopted in a code of ordinances, June 17th, 1887, and duly published.

There has been no occasion for quarantine during the year. If contagious disease occurs, the Board of Health see that the house is isolated, and access to the same is prevented.

The Board have expended during the year \$61.35 for sanitary purposes, and \$100 for legal expenses.

Dwellings are heated by furnaces and stoves. Ventilation about the same as in other towns.

There has been more than the usual prevalence of diarrhoea and rheumatism in the township during the year.

In the month of May last a case of small-pox occurred at a place known as Union Landing, on Staten Island Sound, in the eastern portion of the township, at the fertilizer factory of Williams, Clark & Co. The man was removed to a tent at a distance from the tenement-house where he was taken sick. He was attended by Dr. W. C. Cladik, of Rahway. The case was a virulent one, and after a short sickness the patient died. Luckily, the disease did not spread, and there were no other cases.

(Signed)

EPHRAIM CUTTER,
President.

MONMOUTH COUNTY.

ASBURY PARK BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. D. Pennypacker, President; R. Ross, Clerk; N. E. Buchanan, Jas. A. Bradley, E. Wright, John Rockafeller, E. G. Harrison, David Harvey, Jr.; H. Mitchell, M D., Medical Officer; W. B. Christine, M.D., Chemist. P. L. Lippincott, Health Inspector.

The usual work of inspection of premises has been continued, the Inspector using his time in this manner when not employed in other ways.

Water analysis has gone on slowly, samples from 225 surface wells having been examined by us since October 1st, 1887. Of this number sixty-one have been found to be polluted and ordered closed. The public water-supply has been largely increased during the past year, and the service has proved satisfactory. The quality of the

water has not changed, but continues to be good. The number of water-takers is now 559, an increase of 184 since October 1st, 1887.

The sewers have continued to do their work satisfactorily, and no annoyance has been caused by them. The number of sewer connections has increased during the year to 715.

The storage of manure has occupied the attention of the Board to some extent during the past season, and permits are now given for manure-vaults only where these objectionable structures seem unavoidable. Water-tight floors, saucer-shaped, on the ground surface, are preferred, because fermentation in the manure stored on such floors goes on more slowly, and because each removal of manure from them leaves a clean, dry surface, and little stench is caused when the removal occurs. A water-tight roof is required to be placed over such open floors.

Fourteen cases of scarlet fever have been reported during the year; no deaths. Two cases of diphtheria reported; one death. One case of typhoid fever has been reported; this was an imported case, the patient becoming sick within two weeks after taking up her residence here; the case recovered. No case of typhoid fever has originated in Asbury Park since the public supply of water was introduced—July, 1885.

Electric lighting for streets has been adopted during the past year. Forty arc-lights, of 2,000 candle-power each, have been placed in the borough. The annual cost is \$4,000.

Garbage is still collected under contract, at a cost of \$1,500 per annum. The service is not entirely satisfactory, but it is fairly performed. Rubbish is collected separately. This service is well performed and it is of great value. The carts take all refuse which is placed on the sidewalk or in the street, and the result of this regular gathering up of trash clears out back yards, cellars and vacant lots of an immense quantity of unhealthful material. The rubbish is taken to a dumping-ground and burned daily.

The expenses of the Health Department are still paid by Mr. James A. Bradley. In accordance with the provisions of Chapter LVI., Laws of 1888, an ordinance was adopted July 20th, 1888, to regulate the plumbing and drainage of buildings.

The accompanying blanks have been printed to aid in executing the foregoing ordinance.

(Signed)

RANDOLPH ROSS,

Clerk.

[illegible]

DESCRIPTION OF PLUMBING AND DRAINAGE PLAN.

No.....

To the Board of Health :

As required by Section 2 of the Ordinance of the Board of Health of the Borough of Asbury Park (" To regulate the plumbing and drainage of buildings, and to secure their sanitary condition "—adopted July 20th, 1888), the following DESCRIPTION and accompanying DRAWING are this day.....18.....submitted for approval, and we, the undersigned, hereby agree to do all the drainage and plumbing in the house herein specified, in accordance with the Ordinance of the Borough of Asbury Park.

Location.....St. or Ave.....side.....
.....feet from.....St.
Owner.....
Address.....
Plumber.....
Address.....

WRITE ALL ANSWERS IN INK.

1. Size of lot?
2. Ground surface of lot already covered by buildings?
3. Surface to be covered by proposed building?
4. Number of stories, exclusive of cellar?
5. Is there a cellar?.....
6. How is it to be ventilated?.....
7. How are foundation walls to be constructed?.....
8. How is cellar bottom to be made water-tight?.....
9. Is there to be a basement?.....
10. For what purpose is basement to be used?
11. For what purpose is the building to be used?.....
12. Total number of rooms in building?.....
13. Are all rooms lighted and ventilated by windows opening directly to the external air?.....
14. Are fan lights placed over the doors of bed-rooms?.....
15. Does each bed-room contain at least 800 cubic feet of space?
16. Where does the main drain terminate?
17. Is house-drain above or below cellar floor?.....
18. Size of main drain?
19. Size of soil pipe?
20. Where does air-inlet open?
21. Material of pipe?.....
22. Size of vent pipes?
23. Is there a separate vent pipe?
24. If the cellar floor is of concrete or cement, and covered by a wooden floor, is space beneath wooden floor ventilated?..... How?.....

NOTE.—Drawings shall in each case be furnished to accompany this written description. They shall show every line of supply and waste-pipe, and every fixture, and the location of every stop-cock. They shall also show which way the contents of every pipe flow, and the sizes of all pipes between given points.

OFFICE OF THE BOARD OF HEALTH,

Asbury Park, N. J..... 18... }

This DESCRIPTION OF PLUMBING AND DRAINAGE has been examined, and it is

.....

.....

.....

[ENDORSEMENT.]

Form XVI.

BOARD OF HEALTH OF THE BOROUGH OF ASBURY PARK.

DESCRIPTION OF PLUMBING AND DRAINAGE PLAN.

No.....

No..... Street.

Filed..... 18.....

Inspected..... 18.....

.....

.....

..... 18.....

Final inspection shows that all work has been done in accordance with this Plan and Description and the Ordinance of the Board of Health.

.....

Inspector.

No.....Form xviii.

Certificate of Approval of Plan.

.....18

Structure..Old or New..Stories..

Lot No.....Street No.....

Owner.....

Plumber.....

Remarks.....

.....

.....

.....

No.....BOARD OF HEALTH. Form xviii.

Certificate of Approval of Plan.

Asbury Park, N. J.....18

This certifies that.....has filed in the

office of this Board a plan and description of Plumbing and

Drainage Work proposed to be placed in and upon building

erected on Lot No....., to be known as No.....

Avenue, Street, owned by.....and that

upon careful examination said plan is found to be satisfactory,

and in accordance with the regulations governing plumbing and

house drainage in the Borough of Asbury Park, and the same is

hereby approved.

.....

EXTRACT FROM ORDINANCE GOVERNING PLUMBING AND HOUSE DRAINAGE IN THE
BOROUGH OF ASBURY PARK.
Sec. 2. Before any portion of the plumbing and drainage system of any build-
ing shall be constructed or reconstructed, there shall be filed in the office of the
Board of Health a plan or drawing and written description thereof, signed by
the owner, showing the said plumbing and drainage system entire, from its con-
nection with the sewer, cesspool or vault throughout the entire building,
together with the location of all fixtures, traps, ventilating pipes, etc. No por-
tion of the said plumbing or drainage work shall be executed until said plans
and drawings and written description thereof shall have been approved in
writing by the Board of Health. Before approval, said plans, drawings and de-
scriptions shall be signed by the plumber. After a plan has been approved no
alteration of the same shall be made except upon the written application of the
owner. Written descriptions shall be submitted on blanks provided by the
Board of Health. Said descriptions shall clearly explain all portions of the pro-
posed construction not clearly set forth in the plans or drawings. The work
must be executed strictly in accordance with the approved plans, drawings and
descriptions. This regulation also applies to any extensions or alterations of
existing systems, with the addition that in such cases a plan of the old system,
as well as a plan of the proposed changes, must be filed in the office of the Board
of Health. Drawings and descriptions of the plumbing and drainage of build-
ings erected prior to the passage of this regulation may be placed on file in the
office of the Board.

No.....

BOARD OF HEALTH.

Form xvii.

Certificate of Approval of Plumbing Work.

.....

Asbury Park, N. J.....18

This certifies that I have this day made careful inspection of Plumbing and

Drainage work placed in and upon building erected upon Lot.....

known as No.....Avenue, Street,

and find same satisfactory and in accordance with the regulations governing

plumbing and house drainage in the Borough of Asbury Park.

.....

Inspector of Plumbing.

EXTRACT FROM ORDINANCE GOVERNING PLUMBING AND HOUSE DRAINAGE IN THE
BOROUGH OF ASBURY PARK.
SEC. 83. Every new plumbing system, including those altered or extended,
must be tested by the plumber by the air test, in the presence of an authorized
officer of the Board of Health; all defective joints must be made tight, and
other openings made impervious to gases. Defective pipes must be removed
and replaced by sound pipe.

No.....

Form xvii.

Certificate of Approval of Work.

.....18

Structure...Old or New...Stories...

Lot No.....Street No.....

Owner

Plumber.....

Remarks

.....

.....

.....

ATLANTIC TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel T. Vandever, Colt's Neck; John T. Haight, Colt's Neck; S. Schanck Holmdel; Levi Scobey, Assessor.

EATONTOWN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph Johnston, Eatontown; Jas. E. Borden, Eatontown; Nicholas V. White, West Long Branch; Wm. R. Stevens, Assessor, Eatontown. E. W. Crater, M.D., Health Inspector, Oceanport.

Water-supply from wells and cisterns. Water rather hard; slightly brackish at eastern end of township.

No public drainage or sewerage system. Many houses have cellars containing water the year round. Considerable swamp area. Very little malaria.

No house inspection unless suspicious cases are reported—as when typhoid fever or diphtheria occur.

Everything is thrown by everybody down the water-closet—*"Requiescat."*

Hog cholera is more or less prevalent every summer. It rarely makes its appearance until boarding-house refuse, technically known as "sea swill," is fed in unlimited quantities; it is very fatal, often destroying entire herds.

Slaughter-houses very well kept.

Schools, both public and private, are plentiful, well kept, well lighted and ventilated. I shall shortly make a tour of inspection.

Cemeteries all well kept, and interments made, so far as known, at regulation depth.

(Signed)

E. W. CRATER, M.D.

FREEHOLD.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Bowden, Freehold; O. R. Freeman, M.D., Freehold; Aaron C. Hart, Freehold; O. R. Burt, Jr., Freehold; John Enright, Freehold. W. J. McClure, Health Inspector, Freehold.

The town of Freehold, since the last report of the Board of Health, has extended its limits somewhat, and now includes within its boundary the premises occupied by the Freehold and New York Railway Company, a large shirt factory employing 300 to 400 hands, and a canning factory. This extension makes an increase in our population and it is estimated that the town now numbers about 2,500 inhabitants. The Board of Health is organized under the new law, and in accordance therewith appointed an Inspector, to whom all complaints are made. Notices to abate nuisances are more readily complied with than formerly.

Complaints of persons keeping swine, and of filthy accumulations on such premises, have been in their usual order, and the Board reports progress, and hopes before another season to free the town of these abominations.

We have had several complaints from persons living in the vicinity of the slaughter-house of offensive odors from rendering of fat and refuse. A notice to discontinue the practice and remove to other quarters has produced good results, and the residents in that section will not be annoyed in the future.

The health of the town continues good, and there has been a general compliance with the ordinances on the part of the inhabitants.

HOLMDEL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Michael Taylor, Holmdel; Wm. Morrell, Hazlet; Jas. W. Hoff, Keyport; Aaron Longstreet, Assessor, Holmdel.

HOWELL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Lutz, Farmingdale; Charles Donahay, Turkey; James H. Butcher, Assessor, Turkey. Stephen A. Disbrow, Township Physician and Health Inspector, Farmingdale.

KEYPORT.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

S. V. Arrowsmith, Keyport; Dr. D. E. Roberts, Keyport; Gilbert Devoe, Keyport; Sylvanus Lee, Keyport; J. D. Hopkins, Keyport; A. F. Bedle, Keyport. Jas. M. Walling, Health Inspector, Keyport.

304 REPORT OF THE BOARD OF HEALTH.

Water-supply from wells.

No system of drainage. In portions of the town the cellars are wet.

About twelve tenement-houses, most with cellars.

Very few houses connected with sewers. Cesspools are built with open bottom and sides ; contents used for fertilizers.

Light epidemic of diphtheria and scarlet fever, in the winter months of 1887 and 1888.

No slaughter-houses.

No factories.

(Signed)

A. F. BEDLE,
Secretary.

LONG BRANCH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. W. Silkworth, President, Long Branch; E. B. Blairdell, Secretary, Long Branch; Geo. W. Brown, M D., Long Branch; J. W. Taylor, M.D., Long Branch; Alexander Cooper, Long Branch; J. P. Connelly, Long Branch; Charles Morria, Long Branch. Hugh R. Herbert, Health Inspector, Long Branch.

MATAWAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Garret Hendrickson, Matawan; William A. Close, Matawan; John F. Sirk, Matawan; Richard Bedle, Assessor; Dr. C. Kneet, Township Physician.

There is nothing much that I can say in regard to our system of health regulations, as our Borough Board does not act, and at present we have none but the Township Board.

The health of the township and town has been very good for the year past. No epidemic has visited us.

Our water-supply is from springs and wells.

Drainage natural.

(Signed)

RICHARD BEDLE,
Assessor.

MANALAPAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. C. Sutphen, Clerk, Tennent; Wm. C. Bowne, Freehold; Wm. H. Reid, Tennent; H. W. Long, Englishtown; A. T. Applegate, Physician, Englishtown; S. C. Bowne, Assessor, Englishtown.

The water-supply is from wells and springs ; it has some iron in it, and is both soft and hard.

Surface drainage and under drainage.

Malaria is frequent. Sewerage is by two rows of ten-inch earthen pipes, which have an outlet in a raceway ; the fall is 2 feet to 100 feet ; the whole length of sewer system is 400 feet.

Lighting is by kerosene lamps.

Assessor made inquiry, and found no prevalent disease.

Slaughter-houses are kept in good order and are no nuisance.

There are one file factory, one canning factory and one shirt factory.

School facilities are kept up to the ordinary standard.

The health laws and regulations are those of the State Board of Health.

Registration is looked after, and vital statistics are recorded and forwarded by the Assessor.

There has been no quarantine. The Board is governed by the law, in regard to vaccination.

There has been no prevalent disease.

(Signed)

H. C. BOWNE,
Chairman.

MARLBORO.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Carson, Holmdel ; Peter C. Vandever, Wickatus ; William C. Hulse, Marlboro.

MIDDLETOWN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Morford, President, New Monmouth ; R. S. Snyder, Secretary, Middletown ; J. H. Brainard, Highlands ; J. H. Van Mater, M.D., Atlantic Highlands ; D. D. Hendrickson, M.D., Medical Member of Board, Middletown.

The year has passed without any prevailing disease in our bounds. The natural advantages of the locality have made it the most delightful and healthful resort for city people of any locality within reach of the summer visitors.

There is now a borough within our limits, at Atlantic Highlands, well organized, and being appreciated by New Yorkers purchasing and building their homes where they can enjoy the mountain and ocean scenery and pure spring-water. This has, in its limits, some 500 acres of eligible building lots and grounds. Nearly all depend on spring-water or wells reaching supplies from the springs. There has not, as yet, been any other than private arrangements for drainage or sewerage, and no demand for any. There is a sufficient natural supply from these sources to flush and cleanse all necessary parts of the premises. Indeed, there has been no complaint to the Board of Health since its spring organization that necessitated any more than the passing of ordinances to educate some localities to be cleanly and watchful as to any cause for action of this Board.

There are still two fish-scrap factories at Port Monmouth, but they have shown diligence in their efforts to prevent any unhealthful odor.

While we have no report to make of any prevailing disease or of any contagious cases, we feel that the need of organization in every place is imperative, and have reason to appreciate the efficient co-operation of your State Board in sending all needful helps and directions in the contingency that may arise in a township adjoining the ocean and bay, where a foreign cause of contagious disease may easily be landed on our shores. "To be forewarned is to be forearmed."

(Signed)

R. S. SNYDER,

Assessor.

MILLSTONE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Geo. M. Davison, Perrineville; Albert Thompson, Clarksburg; Rainbert Ely, Ely; A. B. Johnes, Assessor, Perrineville.

We have a clear, open country, and generally healthy.

There are no cities nor large towns in the township.

The water is supplied by sunken wells and clear running streams.

As to drainage, there is no particular system, except what the farmers do to dry their lands.

There are no streets or public grounds other than the highway.

The houses are generally frame buildings, with cellars for family use only. Seldom more than one family in a house.

No sewers or cesspools.

No prevalent diseases of man or animal.

No slaughter-houses.

(Signed)

A. B. JOHNES,
Secretary.

NEPTUNE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel W. Kirkbride, Asbury Park; Dr. H. S. Kinmouth, Asbury Park; Amos Trilton, Hamilton; John C. Patterson, Ocean Grove. E. H. Watrus, Health Inspector, Ocean Grove.

The water-supply is furnished by the Ocean Grove Water Works, sixty-four houses having connection with the same.

West Grove has good sewerage. West Park is not as well off in that way; have to have tight vaults. As to drainage, most of the cellars are dry. There are some swamps back of West Park and West Grove, and there are some cases of malaria, but not as much as two years past. As to sewers in West Grove, they are on the Ocean Grove system, which seems to be very good.

Houses generally have cellars.

There is a house-to-house inspection.

Only one slaughter-house, and that is kept under close inspection.

OCEAN BEACH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jas. S. Huyler, President, Ocean Beach; Thos. Dunbar, Jr., M.D., Ocean Beach; Jacob Titus, Ocean Beach; William L. Kinmouth, M.D., Ocean Beach; Frank P. Philbrick, Ocean Beach; William Bergen, Ocean Beach. Chas. S. Wolverton, Health Inspector.

Water is supplied by driven and artesian wells; irony taste; generally hard.

The usual water-level is not such as to secure dry cellars, in general. No drainage distinct from sewerage.

Houses generally have basements; used only in summer months. There are no tenement-houses. Yearly house inspection.

308 REPORT OF THE BOARD OF HEALTH.

Cesspools are made with brick sides and bottoms, and cemented; emptied with air-tight wagons; carted outside of the borough, and used as fertilizer.

No prevalent diseases. Have a register of persons keeping horses, cows, hogs, &c.

There are no slaughter-houses.

OCEAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James W. Conover, Deal; William Warner, Long Branch; Abraham T Vanderveer, Long Branch; Joseph H. Cooper, Assessor, Long Branch.

OCEAN GROVE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. H. Stokes, President, Ocean Grove; J. L. Hays, Ocean Grove; Holmes Murphy, Ocean Grove; Jos. H. Thornley, Ocean Grove; I. H. Alday, M.D., Ocean Grove; Rev. Geo. W. Evans, Ocean Grove. A. E. Ballard, Clerk and Health Inspector, Ocean Grove.

In the earlier part of the winter there were eleven fully-developed cases of scarlet fever. Most of these were in the eastern part of the Grove, and where there has been comparatively little sewerage. Every case received the fullest sanitary attention, and the rules regarding sulphur fumigation were carried out. It is pleasant to record that no case had a fatal termination.

These were followed by five cases of diphtheria. Two of these were of a very aggravated type. The methods recommended by the State Board were followed in every case.

During the past year there has been a considerable advance in practical sanitation. The grade of the streets has been made to correspond more perfectly with the needs of the water-surface flow, so that it may more readily and rapidly reach the lakes and sea.

The regular water-supply from the artesian wells has met all the needs of the people, except for a short period in the summer, when a very great quantity was used for watering the streets. There is no diminution in the supply from the wells. Five new ones have been

added during the year, making, altogether, thirteen. One hundred and seventy-nine connections of houses with the water system have been made since last annual report, making the whole number of houses connected 562. The surface wells are rapidly exhibiting signs of pollution. In cases where this is suspected, the water is sent to the chemist of the Boards of Ocean Grove and Asbury Park, and its use permitted or prohibited in accordance with the report of its analyzation.

The sewer system still works without difficulty. Its deodorization in the sea does not interfere with the bathing stations above and below them. No perceptible odor or discoloration is discerned ten feet from the outlet. No main pipes have been choked, and but few of connecting ones from the houses. The catch-basins, principally hopper-closets, are being rapidly substituted for the vaults.

Wesley lake has this year given us some trouble. A settlement, mostly of colored people, upon its borders above Ocean Grove, has very largely emptied its filth into the little stream which supplies it. A restaurant is built over it, much of whose refuse finds the same outlet. This was arrested at the head of the lake and raised the level of its bed. The waters were so high in the early spring that it became necessary to lower the water, which exposed the bed of all the upper part to the rays of the sun. The work upon the bridges was immediately suspended, and will not be resumed until after cold weather, at which time the lake will be freed from the accumulations which interfere with its healthfulness. There will be a joint meeting of the Boards of Health of Asbury Park, Ocean Grove and the township in reference to the "settlement" and "restaurant." If nothing can be reached in that way, it will be necessary to indict as a nuisance.

Our garbage system remains as it was. It is collected daily in the hot weather (except Sundays) and tri-weekly or bi-weekly at other times. It is still taken away for nearly ten miles and ploughed under.

The rubbish of the place is carted over into the low swamp ground owned by the Association. In the autumn, such parts of it as will burn are consumed, and the rest remains to gradually fill up the grade.

As the importance of the matter is placed more and more before the people, there is a better attention to cleanliness of house and

street. There has been no year, so far, in which the rules have been so well observed.

The underground cesspools have been greatly reduced in number and are rapidly diminishing. Complaints against them receive the fullest attention from the Board, and upon these complaints notices are issued for their abolishment and the substitution of the sewer system.

Electric lighting has been introduced all over the Grove. It has had the usual difficulties in getting into working order, but no one has been injured, and it now works satisfactorily both in quality and amount of light, and lessens greatly the danger from fire.

RARITAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thos. S. R. Brown, Keyport; John W. Keough, Keyport; Asbury F. Walling, Keyport; A. F. Bedle, Assessor, Keyport.

RED BANK.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Robert Allen, Jr., President, Red Bank; John H. Cook, Secretary, Red Bank; Samuel Cullington, Red Bank; M. M. Drohan, Red Bank; Alfred Trafford, M.D., Red Bank. James Norman, Health Inspector, Red Bank.

Red Bank, N. J., is situated on the south bank of the Shrewsbury or Navesink river, about forty feet above tide-water. The proximity to the ocean renders the climate more equable than it would otherwise be, though the saltness and moisture of the atmosphere are said by physicians to aggravate some diseases. The population is about 3,400.

The soil is sandy, into which the rainfall quickly soaks. Below the sand, which goes to a depth of from three to six feet, is a clayey loam, and below this is the marl stratum. The borough of Red Bank extends along the river and is a little over a mile long, following the river line, and about half a mile wide in its widest parts.

The water for domestic use is procured from ordinary wells, and from the public water system of the town. The well-water or surface-water is in some cases found to be hardly fit for use. The water for

the public supply is procured from a large well, which was dug down through the marl until the water-bearing sand was reached. This water has been analyzed by Prof. Cook, the State Geologist, and has been found to be remarkably pure. The artesian wells of Asbury Park and Ocean Grove derive their supply from the same subterranean source which feeds the well at Red Bank. The demand for water from the public supply is constantly increasing, and it is probable that another well will be dug, or some other means adopted to increase the supply.

The town is destitute of sewers, except such as carry off the rainfall. The town is drained by these sewers, and also by a brook which runs through the back portion of the town. The land has a gradual slope toward the river and also toward this brook, and but comparatively little water is left on the surface of the ground to become stagnant. The cellars and basements of houses are dry, the drainage being such as to prevent the water from settling in the cellars.

The streets of Red Bank are very muddy at certain seasons, particularly in the spring. One of the main streets of the town has been macadamized, but this does not prevent the accumulation of mud.

Quite a number of the houses of the town have basements. These are, as a rule, as dry and comfortable as the upper rooms. Where there are cellars, and not basements, the cellars are used for storing vegetables, coal, &c. Very few of the houses are occupied by more than one family, and most of these are double houses, where the apartments and yards are wholly separated from each other.

Kerosene oil is used almost exclusively for lighting the houses of the town. Gas is used in a few houses and in a number of stores. Many of the stores are now lighted with incandescent electric lights, a plant having been introduced during the past year. The use of this illuminant is gradually finding its way into offices and private houses.

Much of the refuse of the houses is burned, and the Local Board of Health advises that this plan be pursued as far as practicable. There are no connections from houses with the sewers for the carrying away of excreta. Old-fashioned privies are used, some of which have cemented sides and bottoms, while others have not. When the vaults become full or nearly so, the contents are removed by means of air-tight suction hose and barrels or wagon-bodies. These latter

are so constructed as to be air-tight, and so prevent any annoying or offensive odors.

The town has no "markets" aside from the grocery stores and butcher shops.

No record is kept of the diseases of animals. There has not been, so far as known, any epidemic of contagious or other diseases affecting animals here for the past year.

There are no slaughter-houses in the town.

There are no manufactories in the town, in the proper sense of the word. The nearest approach to manufactories are small shops, planing mills, printing offices, &c., where the sanitary conditions are as good as those of dwellings.

The schools of the town are of brick, well lighted and well ventilated, and are kept in a thoroughly good condition. When contagious diseases are found to exist in any family, none of the children of that family are permitted to attend the schools.

No alms-house, hospital, or other charitable institutions of a like kind are found in Red Bank.

The village jail is a small square brick structure, which is under the charge of the town authorities. It is whitewashed frequently, and the cells are kept in as good a sanitary condition as possible. It is seldom used as a place of detention for more than a few hours at a time.

Only one building in town is more than three stories in height. There are no outside fire-escapes attached to any of the buildings.

There are no cemeteries in Red Bank. The laws regulating burials are strictly enforced by all the cemeteries in this neighborhood, and the bodies of persons who have died from contagious diseases are not allowed to be forwarded by rail to places of interment. Public funerals of persons who die from contagious diseases are also prohibited.

The regulations of the Board of Health are similar to those of other towns of like size. A copy of the ordinances and regulations of the Board of Health is enclosed. The notices sent out by the Board of Health, since it was organized, have been obeyed in every instance but one. In that case the counsel for the Board doubted whether the Board had sufficient power to compel the changes to be made which were suggested by the Board. The responses to the notices have been in most cases very prompt, and only in a very few cases was there any

delay in complying with the suggestions or demands of the Board. One of the most common annoyances in connection with this matter has been the number of anonymous complaints sent to the Board. In almost every case, these anonymous complaints, on investigation, proved to be without foundation, and a number of them, when traced to their authorship, were found to have originated in neighborly spite. The Board, finally, was compelled to adopt the rule of paying no attention to anonymous complaints.

Every marriage, birth and death occurring within the town of Red Bank is recorded in the books of the Board of Health. During the year ending October 1st, 1888, there were 58 deaths, 76 births and 49 marriages. Of the deaths, 47 were of white persons and 11 colored; 33 of the deaths were those of male persons and 25 those of female. There were 18 deaths of persons under 5 years of age, 5 deaths of persons between 5 and 20 years of age, 24 deaths of persons between the ages of 20 and 60, and 11 of persons over 60. The oldest person to die was a man aged 95 years.

Every case of contagious disease is quarantined. In most cases absolute isolation of the patient is maintained, except from those in attendance upon him or her. Each case of contagious disease is reported to the Board of Health by the attending physician as soon as he learns of its character. In most cases the quarantining of the patient and the use of disinfectants, &c., are attended to by the physician in charge of the case.

The sanitary expenses are met by the town. A certain sum is appropriated each year for the use of the Board of Health. In no case has this overrun the amount allotted by law (five cents per inhabitant), except during the first year of the organization of the Board, when a complete sanitary inspection was made of every place in town, the cost of which, together with the printing of the ordinances, &c., made the expenses considerably heavier than usual, that year.

Stoves are usually used as means of heating. Some few places are heated with hot air from heaters, and a still smaller number of places are heated with steam.

There have been no diseases specially prevalent.

(Signed)

JOHN H. COOK,
Secretary of the Red Bank Board of Health.

SHREWSBURY TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Jos. W. Child, Red Bank; Forman R. Smith, Fair Haven; Wm. T. Parker, Little Silver.

UPPER FREEHOLD TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Joseph Holmes, Jr., Cream Ridge; Geo. H. Vanderbeek, Allentown; G. H. Worden, Allentown; Isaac S. Dawes, Imlaystown; H. G. Norton, M.D., Imlaystown.

There has been little sickness within the year and nothing worthy of special notice, except typhoid fever, which seems prevalent all over the township, but more especially in and near Imlaystown. There have been nineteen cases in the township; besides, I might mention that I have attended professionally eleven others just out of this township, over in Millstone, near Clarksburg, making a total of thirty cases known to me in a radius of ten miles. In some of the cases it is easy to see what might readily be the cause of the sickness, but in other cases we are unable to discover any cause. The cases in Imlaystown, where the fever has shown itself every summer for several years, are readily accounted for in the faulty, shallow wells and contaminated water, which your analysis has already proven to be unsafe for use. Our only remedy—efforts to persuade people to abandon them—has only availed in one instance, and so the fever continues. Some of the cases outside of the village, I believe, can be traced to infection while visiting families in the village, where the well-water is known to be impure, and where cases have occurred previously. We can find no other cause for the fever breaking out and running through a whole family, in one or two instances in isolated farm-houses, than the supposition that some members of a family in Imlaystown, where the fever prevails, suffering from slight indisposition and diarrhoea (a walking case of typhoid), have visited the farm and remained some time, the fever breaking out that fall or the following summer. In some well-kept farm-houses, where there does not appear to be any unusual unsanitary conditions, there have been severe cases of typhoid this year.

There have been three cases of scarlet fever, which we cite as illus-

trating a possible source of contagion. A farmer's family have been in the habit of boarding, through the summer, about fifteen "fresh-air children," sent into the country by charitable societies in New York, the method being to return them in two weeks and get a "fresh" lot. It was the custom of a young lady in the family receiving these children to sort out, shake out and arrange the clothing of the children upon their arrival and pack it up for them on their return. On the seventh day after the arrival of fifteen children, the young lady whose duty it was to shake out the clothes for the children sickened and broke out with scarlet fever, of which she had a severe attack. One week later her two sisters sickened, but were not as sick as the first case. This scarlet fever was undoubtedly conveyed in the clothing of the children, as none of them were in any way sick during their stay. They had been examined by a physician before leaving New York.

(Signed)

H. G. NORTON, M.D.,
Secretary.

WALL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James L. Allgor, New Bedford; Brannin Neubery, Manasquan; Henry Wainright, Manasquan; A. A. Higgins, M D., Manasquan; John M. Allen, New Bedford.

MORRIS COUNTY.

BOONTON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. A. E. Carpenter, Dr. John G. Ryerson, Richard H. Richards, Wm. I. Powers, W. Ginble, John Manfield.

CHATHAM TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John M. Tunis, President, Madison; B. W. Burnett, Madison; E. P. Miller, Assessor, Chatham; Merrit Lum, Chatham. S. H. Reed, Secretary and Health Inspector, Madison.

316 REPORT OF THE BOARD OF HEALTH.

The Board has done considerable work in abating nuisances.

Inspector's salary, \$50.

We had an epidemic of scarlatina, traceable to influx of new residents on April 1st, and seeming to progress along a certain milk route. Dr. E. M. Hunt was called to inspect the dairy supplying said route, but, on chemical examination of milk, found no infection therein. The type of scarlatina was mild.

(Signed)

S. H. REED,
Secretary.

CHESTER.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. C. Drake, Chester; Theo. B. Wortman, Chester; John Kelsey, Chester; Reuben - C. Carlile, Chester; W. H. Green, M.D., Chester.

The year ending October 1st, 1888, has been with us, as usual, very healthy. We have had no epidemics, and no one disease has prevailed to any great extent. We have had a few cases of scarlatina and a few of diphtheria, but, so far as I know, none have resulted fatally. There were but few cases of cholera infantum during the heated term, and the bowel troubles peculiar to the summer months yielded readily to the recognized mode of treatment. No diseases of domestic animals have been reported.

(Signed)

W. H. GREEN, M.D.,
Physician and Secretary of the Board.

DOVER.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. T. R. Crittenden, President, Dover; Jas. W. Canell, Dover; Fred. H. Beach, Dover; John S. Gibson, Dover; J. J. Vreeland, Dover.

A new water system for the supply of the town was put in operation December 1st, 1887. The water is brought in pipes from 16 wells or springs, to a reservoir, and thence distributed through the town by mains. The surface drainage in the vicinity of these springs or wells is complete, and all the appointments are those of a perfect water system.

There have been isolated cases of diphtheria throughout the year, but they have been carefully looked after, and there has been no general epidemic. At the present time there are no cases of the disease.

(Signed)

JOHN S. GIBSON,

Recorder of Vital Statistics.

JEFFERSON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Tallman, Chairman, Oak Ridge; Albert J. Titman, Secretary, Woodport; Joseph W. Headley, Milton; Charles Jennings, Milton; Leonard Bright, Township Physician, Woodport.

Water-supply is from wells and springs. I think no cisterns are used. In some mountainous districts, in the vicinity of iron mines, families are supplied from the mines. The water is not discolored, but has an iron taste. It is hard. It is not bad at any season. Water-pipes are used in a few places to convey the water from springs. There is no sewage above point of supply other than, perhaps, surface-water from wood lots, &c., in rainy seasons. About an equal number depend on wells and springs.

Drainage is altogether natural, the surface being so irregular that sewers are not needed. Cellars are dry. There are some swamps, where malaria has been frequent, but very few cases are heard of lately.

Streets and roads are kept in good condition, with proper drainage for carrying off all water.

Houses generally have cellars, which are principally used for storage of vegetables. I think there are no houses having more than two families. There is a yearly inspection in the more thickly-settled parts of the township.

Mode of lighting is altogether by kerosene oil.

No sewers used.

No markets in the township.

No prevalent diseases.

No slaughter-houses.

No manufactories.

Schools are in good condition. Some of the school buildings are not what they should be, but most of them are in good condition and have the modern conveniences.

There are no alms-houses or hospitals.

There are no cemeteries other than the old-fashioned burying-grounds or church-yards, of which there are four in the township, and the dead are buried as the law requires.

There has been very little sickness in this township during the year, and no disease having been prevalent, the laws and regulations pertaining to health have not been called into use any more than to make inquiries in regard to the condition of the township.

Returns of vital statistics are all sent in that have been received. I know of a few births that have not been reported, and if I do not get returns in by the time thirty days expire, will inquire and report.

We have no plans for dealing with contagious diseases. Vaccination is not universal.

The sanitary expenses will not exceed \$20 so far this year.

Houses are heated by stoves burning wood or coal. Ventilation is secured by dropping upper window-sash.

No diseases prevalent this year.

The reason that there is very little to report from this township is because it is very thinly populated—most of it a mountainous, wild district, dotted here and there with iron mines, and generally very healthy.

(Signed)

ALBERT J. TITMAN,

Secretary.

HANOVER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph H. Bastedo, Assessor, Boonton; Wm. Bates, Parsippany; Marcus Dixon, Gray Hills; Isaac Clark, Morris Plains.

Water-supply is springs and wells, as it is a farming township.

There are four private slaughter-houses.

There has been no prevailing disease among stock.

There are four large paper mills in the township—one at Old Boonton, two at Monroe and one at Whippany.

There are no graded schools in the township.

The county alms-house is at Old Boonton; the Children's Home at Parsippany; the State Insane Asylum at Morris Plains.

The cemeteries are at Parsippany, Whippany and Hanover.

(Signed)

J. H. BASTEDO.

MENDHAM TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

John S. Stiger, M.D., Mendham; John D. Lindsley, Assessor, Mendham; E. C. Blagure, Mendham; Jos. Campbell, Mendham; Madison Connett, Brookside.

MONTVILLE TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

John H. Capstick, Montville; John Husk, Montville; Garret B. Jacobus, White Hall; Asa T. Cook, Assessor.

About 1,200 inhabitants.

The water-supply is from springs and wells.

Principally frame dwellings, occupied in general by one family only.

MORRIS TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Thos. H. Clifford, Morristown; John Denmar, Morristown; John W. Hays, Morristown; Wm. H. Mesler, Morristown.

In Morristown there is a private corporation known as the Morris Aqueduct. The town is supplied by this company with water. The water is taken from springs. Outside of the town, wells are used almost entirely.

We have no sewers. Cesspools are resorted to, in Morristown.

Lighting is by gas and electric light.

Cesspools are cleaned by private persons; swill is also collected and removed the same way.

There are no large markets.

Only small slaughter-houses and not much used.

Good public and private schools.

We have a police force of five persons.

There is a good fire department.

Morristown has a Board of Health, and there is very little for the township Board of Health to do, as nearly all the township is included in the city.

320 REPORT OF THE BOARD OF HEALTH.

MOUNT OLIVE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George A. Smith, President, Drakestown; Enos G. Budd, Recorder, Budd's Lake; Abram J. Drake, Stanhope; Nelson Salmon, Flanders; J. S. Farrow, M.D., Flanders.

Our report, according to the schedule, is the same as for 1885, 1886 and 1887. No epidemics of any kind.

(Signed)

G. A. SMITH,
President.

PASSAIC TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Andrew Bird, Long Hill; I. F. Miller, New Vernon; F. Leo. Hendrickson, New Vernon; Oscar Lindsley, Assessor, Green Village.

Passaic township is largely agricultural. One small silk mill and one harrow factory on its southern border. Healthy; few deaths, and never any signs of epidemic of any sort.

(Signed)

OSCAR LINDSLEY,
Assessor.

PEQUANNOCK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

H. V. Day, M.D., Butler; Theo. F. Cox, Butler; Samuel De Mott, Pompton Plains; Richard T. Budd, Mountain View; Wm. H. Beam, Pompton Plains.

The health of our township is good. It is a healthy part of the county. No very filthy places in it. Everything that is unhealthy is promptly removed.

We had some malaria in the lower part of our township, because of some stagnant water, which we had removed by draining.

No slaughter-houses.

No nuisance of any kind.

No contagious diseases of horses or other animals.

Our factories are kept healthy by airing and careful management..

RANDOLPH TOWNSHIP.

There is no Township Board of Health ; the Town Committee have never organized as such. The town of Dover has, and J. S. Gibson is Secretary.

(Signed)

D. S. ALLEN,
Township Assessor.

ROCKAWAY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edmund D. Halsey, Rockaway ; Edward Fox, Rockaway ; Samuel T. Smith, Rockaway ; E. B. Mott, Rockaway.

A few years ago, while Assessor of Rockaway township, I made two or three reports, which included about all the information that I could give at present, as no changes have been made, except the erection of the usual number of buildings—wood and brick.

(Signed)

E. B. MOTT,
Assessor.

ROXBURY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

R. C. Applegit, Chairman, Stanhope ; Theo. F. King, Secretary, Drakesville ; John A. Honnell, Assessor, Succasunna ; J. L. Taylor, M.D., Succasunna.

The supply of water is from springs, wells and cisterns ; principally soft water, without taste of iron.

There is no system of drainage or sewerage.

The cellars are dry, except a few instances in very rainy seasons.

There are no swamps that are known to produce malaria.

Houses have cellars in most cases ; they are largely used for storage of vegetables. There are very few houses with even two families. There is no house inspection.

Have no cesspools or sewers.

There have been no prevalent diseases in the township during past year.

322 REPORT OF THE BOARD OF HEALTH.

The Assessor is acquainted with loss of animals and contagious diseases, if any.

No slaughter-houses in township.

(Signed)

THEO. F. KING,
Secretary.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

F. M. Stephens, German Valley; Dr. E. C. Willet, German Valley; Philip Schuyler, Parker; Jacob Hann, Pleasant Grove; W. S. Swaskhamer, Middle Valley.

There is no prevalent disease to be reported.

Other things as last report.

OCEAN COUNTY.

BERKLEY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas Harvey, Frank Wilsey, C. Lawrence, Henry Williams, Bayville.

Our township, as regards population, is small, and its location remarkably healthy.

Drainage naturally perfect, and as a general consequence free from most diseases. There have been a few cases of dysentery, caused by imprudence in eating fruits not fit to be eaten.

No slaughter-houses, and the cemeteries and school-houses are kept in proper condition.

No doctors in the township, and seldom are they required.

(Signed)

C. LAWRENCE,
Chairman Township Committee.

BRICK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

O. W. Budlong, M.D., Lakewood; I. V. Hall, Lakewood; J. L. Dorsett, West Point Pleasant; C. C. Pearce, Burrsville; H. E. Havens, Burrsville. B. H. Fielder, Jr., Health Inspector, Burrsville.

DOVER TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

R. B. Gowdey, Toms River; John Tilton, Silverton; James I. McKelvey, Toms River.

EAGLESWOOD TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Joseph P. Haywood, Chairman, West Creek; Samuel P. Cranmer, West Creek; John F. Jones, West Creek; Samuel Ashurst, M.D., Beach Haven; C. R. Cox, Sr., Assessor, West Creek.

Water-supply mostly from brick and stone wells with platform and pumps. Some use brook-water. Generally good water.

Drainage is by surface drains and underground pipes.

Cemeteries for burial purposes all on high land.

Health generally very good here.

Rather careless about vaccination.

JACKSON TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Conover Matthews, Secretary, Jackson's Mills; Joseph R. Brown, Cassville; John W. Jimison, Cassville; Joseph S. Clayton, Jackson's Mills.

In regard to the general health of Jackson township—it is thinly populated, and the health is generally good.

LACY TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Thomas C. Vanarsdale, Forked River; Garret Stout, Forked River; Frank Mathews, Forked River.

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MANCHESTER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Michael McCallion, Manchester; Wm. Montgomery, Manchester; Chas. Havelaniel, Manchester.

The water-supply is drawn from wells. The water is pure and soft, and is readily obtained.

There is no system of drainage. Houses, as a rule, are separate from each other. As the soil is sandy and light, it readily absorbs all such matter. The usual water-level is such as to secure dry cellars. There are more or less swamps in the township. It is not claimed that, as a rule, malaria results or arises from the swamps.

The houses generally have small cellars, and are used for the storage of family vegetables. Very few houses have two families, probably not more than 25.

Sewers are not used. Cesspools are not, as a rule, cemented; they are bricked up loose, or are holes dug in the ground and planked up. They are cleaned out when full, or necessary, with shovels.

We do not think the Assessor makes any inquiry as to diseases of animals.

We have no slaughter-houses.

No new manufactories.

While there were several cases of typhoid fever and malaria in different parts of the township during the past season, it was not claimed, by the attending physician, that they were caused by the bad sanitary condition of the natural surroundings. There are more or less cranberry bogs located in this township, which, during a part of the year, are covered with water; after the water is drawn off, it is claimed, by some persons, that the dead vegetable matter lying thereon produces an unhealthy state or condition in the atmosphere in the immediate neighborhood of the bogs; but as these bogs have been in existence for many years near the village, and the general health of the inhabitants has been good and free from complaint that would be likely to arise from such a condition, the complaints may be more imaginary than real. As the township extends over a large area of surface, and the greater portion of it is sparsely settled, it is hardly possible for me to answer your question fully, or in any definite form. The Township Committee have endeavored to perform their duty to the best of their ability.

(Signed)

MICHAEL MCCALLION.

OCEAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph Camburn, Waretown; Wyckoff Letts, Waretown; William Gray, Barnegat; J. H. Wilkins, Waretown.

The township is very small, and very healthy. Drainage is good. No malaria; no contagious diseases. Water-supply mostly driven wells; some open wells. There is no physician in the township.

PLUMSTEAD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Walter Cottrell, New Egypt; Edgar A. Horner, New Egypt; W. T. MacMillan, M.D., Township Physician; Winfield Scott Choffey, New Egypt; Aaron S. Bronson, Assessor, New Egypt.

This township has been comparatively free from contagious diseases the past year.

Our Board of Health promptly remove any nuisance when reported and promptly attend to all business which belongs to them as a Board of Health.

(Signed)

W. T. MACMILLAN, M.D.,

Medical Member of Board.

The village depends on wells generally; water soft and of good taste. Cesspools open at bottom; contents are carted off by farmers and used on the land.

Slaughter-houses are kept in good condition.

(Signed)

A. S. BRONSON,

Assessor, New Egypt, Ocean county, N. J.

STAFFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edward E. Predmore, Manahawkin; John Letts, Manahawkin; Lewis A. Cranmer, Cedar Run; I. H. Cramer, Assessor, Cedar Run; P. K. Hilliard, M.D. Manahawkin.

The water-supply is almost exclusively from open wells or driven wells. The latter, however, are rapidly taking the place of open wells, and the water is generally drawn from a depth much below the other springs. The quality of the water throughout the township is apparently excellent, with the exception of a few surface wells. The water is clear, with no unpleasant taste, so far as I have been able to learn, except within a limited area of the low ground in the southeastern part of the township, where the water used rises to within a few feet of the surface—two to eight feet.

No system of drainage has been adopted. Dry cellars may be constructed anywhere in the township, except in the area of low surface mentioned above. Swamps are numerous along the bay shore, but malaria is almost unknown in this section, unless contracted elsewhere.

Nearly all houses are constructed with cellars, and such cellars are largely used for the storage of the family supply of vegetables, &c., but the houses are built singly, and the ventilation is generally good.

But little attention is given to the subject of sinks and cesspools, and their proper construction. Most of them are mere depressions in the ground, and even if cemented the work is but imperfectly done, and when emptied at all, the contents are used as fertilizers.

The public health is good, and no special circumstances prejudicial to health are known to exist in the township.

(Signed)

I. H. CRAMER,
Assessor.

UNION TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

L. G. Mitchell, Barnegat; Dr. Edmund Bennett, Barnegat; Wm. Cox, Barnegat; Joseph Pharo, Barnegat; John Predmore, Jr., Barnegat.

The location of our little township is so well and favorably known that it needs no comment. We have a population of about 1,300 inhabitants, and our death-roll is comparatively very light, resulting from pulmonary or lung diseases chiefly. This is owing presumably to our nearness to the sea and the consequent heavy atmosphere. There have been a very few cases of typhoid fever, two or three of which resulted fatally. Among our small list of deaths during the

past year is the name of one who lived to the age of ninety-eight years, and we have a goodly number of life-residents of our township, who are yet enjoying fair health, between the ages of seventy and ninety years.

The topography of our township is quite varied, some parts being very high, making it difficult to obtain water at less than sixty or seventy feet. The supply is all derived from wells, both dug and driven to depths ranging from eight to sixty feet.

Our public school-house and grounds have been made the subject of complaint by some of our citizens, the same being located on rather low ground and being cramped for room. The difficulty has been remedied, however, by buying additional land and the filling in with gravel and draining of the lower portions. The principal remaining difficulty is in the ventilation and the drinking-water supplied to the children, which we intend to try to have remedied.

(Signed)

LEWIS G. MITCHELL.

PASSAIC COUNTY.

ACQUACKANONK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. H. Mercelus, Clifton; D. H. Schoonmaker, Richfield; W. C. Fredericks, Passaic Bridge; Peter J. Kipp, Assessor, Clifton; Dr. Ayres, Upper Montclair.

Population about 6,000. Location, mostly high ground. Climate moderate.

Bounded on the north by Paterson, on the east by Passaic river, on the west by Morris mountains, on the south by Essex county.

Water is supplied by wells, cisterns and springs.

Drainage is by natural courses; no sewerage.

There are no public grounds.

Houses are mostly frame.

The mode of lighting is by oil.

There are no markets.

Have heard of no diseases of animals.

328 REPORT OF THE BOARD OF HEALTH.

The manufactories are, silk mill, varnish factory, paper mill and oil-cloth factory—one of each.

There are four public schools.

There is one Jewish cemetery.

Public health good.

Registration and vital statistics mailed to Trenton.

Dwellings are heated by stoves; ventilated by doors and windows

There are no prevalent diseases.

(Signed)

P. J. KIPP.

LITTLE FALLS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Squire Badcliffe, Little Falls; William H. Beattie, Little Falls; Joseph Sharp, Paterson. Mark Van Winkle, M.D., Health Inspector, Little Falls.

Location, Passaic valley. Ground rolling. Geology not known.

Water-supply from sunken wells; generally good.

Drainage moderately good—or rather, naturally good.

Streets nothing to boast of.

No public grounds.

Some tenements, many cottages; tenantry, mill operatives.

Refuse pretty generally thrown upon the highway. Excrement disposed of by the old-fashioned hole-in-ground method, called privy; often allowed to accumulate till it overflows for years.

Manufactories and trades consist of felt, hair, carpet, drugget, silk, dyeing, feed and flour mills.

Three public schools in township. Average attendance, fifty. Ventilation good. Location on elevated ground. Heated by stoves and basement heaters.

Health laws are not regarded fully.

Registration pretty generally attended to.

No quarantine. Contagious diseases are attended to at homes and residences.

Expenses for inspection and labor hired, \$50. I have not received any compensation since my appointment, over two years ago.

Dwellings are heated by stoves or burners and basement heaters.

The prevalent diseases of the year were rheumatism, bronchitis, remittent and intermittent fevers.

MANCHESTER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Albert S Beakes, Paterson; John W. Campbell, Paterson; Richard E Doremus, Paterson; S. Cyrus Townsend, M D, Paterson; Wm. D Berdan, Paterson.

Water-supply is from wells, springs and cisterns.

No sewers in the township and no other than natural drainage. Cellars are dry generally.

A tract of land in the village of Haledon, known as Cedar Cliff Park, containing about 100 acres, has been laid out in blocks and streets—or rather, a part of the park, say about forty acres, has been graded and quite a number of lots have been sold. Two large mills have been built; one of the mills is for weaving silk, the other one is for weaving upholstering goods. Some eight or ten dwelling-houses have been built and finished and several more are under way. Streets and public highways are in fair condition. We have about two miles of road macadamized, with fair prospect of having about as much more next spring.

Houses are built of stone, brick and wood, and are in good condition; mostly owned by occupants. There are some tenement-houses in the township.

Refuse is disposed of in various ways; mostly used as fertilizers.

No markets, except a few country stores.

No slaughter-houses and abattoirs in township.

There are five school-houses and five public schools in the township. In my district (No. 9) we have built and almost finished a very neat new school-house; size of building, 24 feet by 36 feet, two stories high. One church in township.

No alms-houses or hospitals in Manchester.

No protection against fire.

There are two cemeteries at the Goffle—one German and one Jewish; there are two at Totowa—one Roman Catholic, known as Holy Sepulchre, and a new one, called Laurel Grove Cemetery; all in Manchester township.

We have a code of laws for the health of inhabitants of township.

We are as careful as we can be in relation to the health of people of the township. Have had no contagious diseases nor any prevalent sickness in the township during the past year.

330 REPORT OF THE BOARD OF HEALTH.

Dwellings are heated generally with stoves, &c.

No diseases have prevailed to any extent the past year in township.

(Signed)

WILLIAM D. BERDAN,
Secretary.

PASSAIC.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. F. H. Rice, President, Passaic; Joseph Adams, Secretary, Passaic; Dr. R. A. Terhune, Passaic; D. Demarest, Passaic; L. Aldouse, Passaic; M. King, Passaic. Wm. Hendry, Health Inspector, Passaic.

Location, high. Population, 10,000. Climate, temperate.

Water-supply very good; from Vreeland's lake; furnished by the Acquackanonk Water Company.

No sewerage. Surface-draining in the Passaic river and cesspools.

Macadamized streets. No public grounds.

Modes of lighting, gas and electric lights.

Refuse and excreta taken out of city and used by farmers.

Have five public schools, a number of private schools, and one public library.

Have a city poor-house, home and orphan asylum.

Have a police force and a city lock-up.

Have three steam fire engines, two hook and ladder trucks and one hose company. No fire-escapes.

There are two cemeteries in the city limits; one seldom used and one quite frequently. Burials in city not less than six feet deep.

Public health laws and regulations are regulated by city ordinances.

The Secretary of the Board of Health is Register of Vital Statistics, and reports are made according to law.

Quarantine exercised over contagious diseases. Small-pox cases quarantined, when they exist. All school children are vaccinated.

(Signed)

JOSEPH ADAMS.

PATERSON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Theodore Y. Kinney, M.D., President; Charles N. Sterrett, James Mills, Frank E. Agnew, M.D.; Cyrus W. Baldwin, Registrar. John L. Leal, M.D., City Physician and Health Inspector.

Previous reports have covered nearly all the points enumerated in the schedule, and we have only to add the following :

About one mile of new sewers has been constructed since the last report. As rapidly as the sewers are built, houses are connected therewith, thus doing away with cesspools and vaults in that neighborhood.

Two parks, having a total area of thirty-two acres, have been purchased, and in time will be improved.

Market inspection has been provided by the Board. The Inspector has condemned large quantities of bad meat and decayed vegetables.

Three new school-houses have been built, having a total seating capacity of 1,800, yet the schools are all overcrowded.

The city jail has been rebuilt, and is now in good condition.

The method of placarding houses in which are cases of contagious disease, has been adopted as an experiment, hoping that isolation may be thus made more perfect.

Appropriation for fiscal year, \$3,500.

Scarlet fever and diphtheria have been very prevalent during the year, as the following table will show :

	CASES.	DEATHS.
Scarlet fever.....	966	165
Diphtheria.....	238	72
Typhoid fever.....	43	21

These figures are for the year ending October 1st, 1888.

One case of small-pox was under treatment.

(Signed)

JOHN J. WARREN.

POMPTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Martin Drew, Midvale; William C. Monks, Erskine; Daniel A. Wheeler, Erskine; Lemuel Van Ness, Pompton; Dr. R. B. Day, Butler.

The water-supply is from wells, springs and natural running streams. Have no artificial drainage. Not much malaria.

Refuse and excreta are carted away once a year; quite often used as fertilizers upon the land.

(Signed)

MARTIN DREW,
Chairman.

WAYNE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Peter J. Doremus, Chairman, Paterson; David F. Duncan, Paterson; G. G. Jeffries, Mountain View; James D. Berdan, Paterson.

Water in the township of Wayne is obtained from wells or springs, mostly from wells, and is generally good.

There is no drainage except on low ground, which is ditched. The cellars are dry. There are no sewers.

No public grounds. The roads are worked by hire.

Nearly all houses have dry cellars, which are used for the storage of vegetables.

There are very few houses with more than two families; there is no house inspection.

We have no complaints on account of slaughter-houses.

There is one public burial-ground and several private ones.

We organize in the spring, and our township being unusually healthy, the committee do not think it necessary to appoint a physician and Health Inspector.

We keep a record of births, marriages and deaths.

There have been no prevalent diseases during the year.

(Signed)

JAMES D. BERDAN,

Secretary.

WEST MILFORD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Oscar F. Smith, West Milford; Charles Oliver, Oak Ridge; Jos. Henion, Echo Lake.

Scarlet fever has been prevalent.

The rest of the schedule of subjects is same as has been reported in previous years.

SALEM COUNTY.**ALLOWAY TOWNSHIP.****NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Wm. E. Simkins, Alloway; Daniel P. Hitchner, Alloway; Daniel M. Hitchner, Cohansey; W. L. Ewens, M.D., Alloway; Chas. Johnson, Assessor, Alloway.

ELSINBORO TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Amos Harris, Salem; John G. Holme, Salem; A. Smith Reeves, Salem; J. W. Powell, Assessor, Salem.

No prevalent or contagious diseases; have had a few cases of typhoid and scarlet fevers.

LOWER ALLOWAYS CREEK TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Dr. F. B. Harris, Canton; W. W. Patrick, Quinton; W. S. Smith, Hancock's Bridge; John M. Pancoast, Hancock's Bridge; Mark T. Hilliard, Hancock's Bridge.

The report stands about the same as last year, no disease being prevalent. There has been but very little sickness during the past year, with the exception of one case of typhoid fever, which resulted in death.

(Signed)

MARK T. HILLIARD,
Assessor.

LOWER PENNS NECK TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Chas. W. Dunn, Salem; Wm. Newell, Pennsville; Chas. Lindsay, Salem; Obadiah Hurley, Pennsville; Hance Jaquette, Pennsville; James J. Moore, Pennsville; Edmund H. Lawrence, Pennsville; Elsworth Irelan, Pennsville.

Water-supply natural, by springs in the earth; at times hard, other times soft; generally bad in summer months.

334 **REPORT OF THE BOARD OF HEALTH.**

Drainage, soil, generally; low in some places; water often in cellars. Swamps near. No malaria.

Sewers very few in this township; no account whatever.

Pretty nearly all houses have cellars, some of which are used for storage of vegetables. Two houses have three families each.

There is no yearly house-to-house inspection.

Sewers are not used. Cesspools have open bottom and sides; contents mostly remain one year before being removed, and are sometimes taken by the farmers and used for growing vegetables and grain.

No prevalent diseases so far. The Assessor inquires after animals and diseases.

We have no slaughter-houses in this township.

We have one tomato-canning factory in this township. No apparent evil results therefrom.

The population in this township is increasing very much. There have been very few deaths this year.

(Signed)

CHAS. W. PALMER,
Assessor.

MANNINGTON TOWNSHIP.

NAME AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David S. Fogg, Chairman, Salem; Wm. H. Acton, Secretary, Salem; Dr. W. C. Hinchman, Salem; Woodnutt Pettit, Salem.

The water-supply is mostly by wells and cisterns.

Cellars are mostly dry. Some few swamps in the township. Malaria prevails to no great extent.

Refuse and excreta are disposed of by farmers.

No disease prevailed to any great extent. One or two cases of disease in cows were reported in the spring, which were quarantined but did not prove contagious.

(Signed)

WM. H. ACTON,
Secretary.

OLDMANS TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Asa G. Turner, Pedricktown; John S. Hampton, Pedricktown; Jacob J. Hunt, Auburn; W. Albert Justice, Pedricktown.

Water is obtained from wells almost invariably, although there are some who have springs on their farms, and prefer to make use of them.

Township health seems to have been rather above average during the past year.

(Signed)

W. ALBERT JUSTICE,
Assessor.

PILESGROVE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Richman, Sharptown; John G. Borden, Woodstown; George B. Grier, Woodstown; Charles H. Richman, Assessor, Woodstown; P. G. Sowder, Physician, Woodstown.

Water-supply principally from wells and springs; good and soft, except in the neighborhood of deposits of marl.

Drainage by tile-drains, or natural drainage by porous subsoil. Cellars dry. But few swampy grounds.

Houses generally have cellars. In general, house-cellars are not used for the storage of vegetables.

No sewers used. But few, if any, cesspools. Common privies, without vaults; contents used for fertilizers.

No prevalent diseases among animals this year. No inquiry made as to loss of animals..

No inspection of slaughter-houses and no complaint made against them.

Have no manufactories and trades, except in a small way.

School buildings in good repair; schools well attended; no complaints known.

Have no alms-house.

Have no public cemeteries.

Have no special public health laws and regulations.

Dwellings heated by stoves, using coal or wood.

No prevalent or contagious diseases this year. The health of the township for the last year has been good.

But little, if any, hog cholera. No diseases among horned stock, except the loss of a lot of western cattle by one of our dealers, attributed to long confinement in cars and after-exposure to storms. No complaints made to the Board of Health.

(Signed)

C. H. RICHMAN,
Assessor.

PITTSBORO TOWNSHIP.

In response to your request, I will give you, as far as I can, a short account of the diphtheria cases here in our little town of 1,000 inhabitants.

The disease made its appearance about the 10th of October, 1887, in a family who lived in very close quarters near the mill-pond. The result was the death of two boys, aged ten and twelve, a daughter, aged thirteen, and one aged fifteen years. Another son, aged twenty, had a slight attack, which did not prove fatal. A baby of eleven months of age, who was in the house a part of the time, continued healthy. The sick ones were all on one floor, there being but two good rooms in the house, and they adjoining each other. Funerals were private. About three hundred yards from this house another family—mother and two children—was stricken; one child died. The same week there were three other cases, in different parts of the town, that seemed to have no connection with the previous ones. A young lady died in four days. Two children, in two other families, lived only a week from the time they were taken. A lady of forty, who did washing for a family with the disease, also had it, but recovered. Another case (fatal) was a child, two years of age, in a family of four; none of the rest took it. Out in the country, four miles from Elmer, four children out of five died. These cases all occurred inside of thirty-five days. There were doubtless other cases which I do not think of now. About the first of May, this year, a young lady of twenty, in one of the best families, died suddenly with it, and there were thirteen severe cases within thirty days, about one-half of them having proved fatal, one a young man of twenty. The funerals have mostly been private. There have been in both epidemics twenty-seven cases and seventeen deaths, as I now recollect them. There were doubtless other cases, which I do not think of.

(Signed)

S. P. FOSTER,

Elmer, N. J.

QUINTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESSES OF MEMBERS AND HEALTH INSPECTOR.

C. T. Patrick, Clerk, Quinton; Chas. Walker, Quinton; John G. Fowser, Salem; Uz Ayars, Shiloh; Henry L. Davis, Quinton.

Water-supply from wells.

No system of drainage ; soil so porous as not to need much drainage.

Most all houses have cellars ; they are used by some farmers for storing potatoes, but the larger per cent. of farmers sell their produce in the fall, rather than store it.

State laws in regard to public health carried out.

(Signed)

HENRY L. DAVIS.

SALEM.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William T. Hilliard, President, Salem ; Josiah Wistar, Secretary, Salem ; Thomas J. Craven, Salem ; Simon B. Smith, Salem ; Zachens B. Sickler, Salem ; C. M. Shenon, M.D., City Physician, Salem ; S. Luther Richmond, City Recorder, Salem. William Carney, Health Inspector.

In presenting our report for the year ending October 31st, 1888, we regret being compelled to state that the general health of our city has not been so uniformly good as in some previous years.

Several cases of typhoid fever occurred during the autumn of last year, for some of which the supposed cause was ascertained to be a contaminated well of water, and a remedy was applied. In other cases, no satisfactory reasons could be assigned for the existence of the disease, except the general one, of an unusually wet season. Some cases of the same kind of fever occurred during the months of September and October of the present year, which could only be accounted for on the same general principles, the rainfall during those months being unusually heavy. Several alarming cases of diphtheria have occurred during the last few weeks, some of them resulting fatally in a short time, not yielding in the least to medical treatment. A thorough investigation of the premises where it proved most fatal, failed to reveal any cause whatever for such unusual mortality. (A chemical examination has since shown contamination of well by sewage.)

The water-supply continues the same as mentioned in previous reports, the drinking-water being very generally obtained from private wells, which are from ten to fifteen feet deep ; the water from which, though not particularly pleasant to the taste, is believed to be wholesome. The water supplied from the public water-works, distant three and one-half miles from the city, continues to be of an unsatisfactory character for drinking and culinary purposes, except, perhaps, in the

winter season. The remedies heretofore applied have not proved effective, and it would seem to be a necessity to sooner or later abandon the present source at Laurel Run, and seek some other supply.

The same difficulty of effectually draining our streets, as previously noted, still exists, owing to the surface, particularly in the central portions of the city, being flat. To remedy this in part, the Board of Health have employed a person, during the summer months, for the past few years, to flush and clean the gutters once or twice in each week, with very satisfactory results.

No general system of public sewers has as yet been adopted. One of the short ones, which in a former report was mentioned as having given us much trouble, after being relaid and its capacity increased, has proved very satisfactory and has occasioned no further complaint. As the public or city water is being more and more introduced into private dwellings, the necessity for some general system of public sewerage becomes more and more apparent, and, in the opinion of this Board, cannot safely be much longer delayed. The wells being shallow, there is constant danger of the water being more or less contaminated from the cesspools into which the pipes from water-closets empty.

Privies are mostly constructed without deep vaults, and care is taken to have them frequently emptied, that service being generally performed at night, by persons who make it their special business. One of our ordinances prohibits their being placed within fifty feet of a well of water, unless the vault is made water-tight by the use of cement.

Houses are almost uniformly built with cellars, which for the most part are dry, the only exception being in the lower portions of the city in times of excessively wet weather. More care is, perhaps, taken than formerly not to go to too great a depth in digging them.

Since we succeeded in having the slaughter-houses removed to a greater distance from the built-up portion of the city, and have exercised a care that they should be properly kept, we have had little or no trouble from that source. We are convinced the plan adopted is preferable to banishing them entirely from the city limits, as at one time proposed, as we are now able to have a supervision of them.

There have been no diseases of animals to note. The so-called hog cholera, which prevailed to such an extent two or three years ago, had the effect to diminish the number of swine kept by our citizens, which

removes one source of trouble and annoyance, it being difficult to have their styres maintained in a cleanly condition.

Improved systems of heating and ventilating have been introduced into one of our public school buildings, which have proved very satisfactory, and it is believed all our school buildings are reasonably well provided for in these respects. Much complaint is made of the insufficient ventilation of the court-room, and we hope it will early receive from the Board of Chosen Freeholders the attention which its importance demands.

In addition to the new public cemetery noticed in a former report, the Roman Catholics have purchased a site and laid out and consecrated a cemetery for their own use, which relieves a want long felt, the one heretofore used by them being quite too full to permit of any further interments without endangering the health of the neighborhood.

We continue to appreciate the advantages of the law allowing to such cities as ours the benefit of a Health Inspector, and the improvement in the sanitary condition of the houses and premises, since his appointment and inspections, has been quite marked. Having funds at our own disposal is another great improvement over the system of former years, when we were dependent upon the City Council for money to defray any expenditures we felt called upon to make in the interest of improved health.

The vital statistics have been accurately kept by the City Recorder as required by law.

In conclusion, we would say that, while conscious of our own shortcomings, we can but hope some good has been effected by our efforts, particularly in the way of convincing our citizens of the importance of a more strict observance of all sanitary measures and regulations, though we have abundant evidence there is much more to be done in this direction.

(Signed)

JOSIAH WISTAR,
Secretary.

UPPER PENNS NECK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel C. Springer, Chairman, Pennsgrove; John M. Bevis, Pennsgrove; Dr. Dave Moore, Medical Member, Pennsgrove; Amos Morris, Assessor, Pennsgrove. S. P. Ward, Health Inspector, Pennsgrove.

340 **REPORT OF THE BOARD OF HEALTH.**

Pennsgrove is located on the east bank of the Delaware river, opposite Wilmington, Delaware.

The supply of water is generally by wells.

The drainage is not first-class. The town is drained by ditches, &c.

Some of our houses have water in cellars during rainy seasons, although some have tile-drains.

Slaughter-houses are kept in good condition.

This year has been a very healthy one in this locality.

Pennsgrove has a graded school, with five teachers. There are four other school-houses in the township, all in first-class repair and working well.

No diseases prevailing here this year.

The Board of Health was called out to abate a hog-pen nuisance. The owner promptly removed it.

(Signed)

A. MORRIS,

Assessor.

UPPER PITTS GROVE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jos. N. Gray, Secretary, Pittsgrove; Jacob H. Mead, Elmer; Benjamin Bassett, Pittsgrove; Albert L. Sturr, Monroeville; M. J. Paulding, Physician, Daretown.

Springs and wells are principally used for stock and drinking purposes. There is no general cause of pollution in a well that is in constant use.

The rolling character of the ground or land affords a perfect system of drainage, the springs and surface-water finding their level in the ponds used as water-power.

Houses generally have cellars. Vegetables on small farms are stored in the cellars. On the larger farms cellars are constructed separate from the dwellings, for storage of vegetables. There are no tenement-houses of more than two families.

Have no sewers. All manures and other matter of a fertilizing nature are drawn in wagons to the fields and plowed under.

No prevalent diseases among animals are reported this year. One case of fatality among swine was reported; not of cholera, however, but the name ascribed was "thumps," occurring in the months of October and November.

Have one slaughter-house, tidily managed.

Two canning-houses have been in operation within the limits of the township this year, and especial pains have been taken to abate any nuisance that may arise therefrom. These two tomato-canning factories form an important feature of the industries in the township, giving employment to a large percentage of the laboring people, both male and female.

This township has a record of births, deaths and marriages carefully kept, and returns are forwarded to Trenton.

Care over contagious diseases is regulated by State law. The family physician looks after all cases of vaccination.

The sanitary expenses amount to \$10.

Wood from the surrounding country and coal from the mines of Pennsylvania are used for heating, and plenty of ventilation is obtained in the country.

There have not been ten cases of any disease this year, so the township physician reports. A few cases of diphtheria were attended with no fatal results.

SOMERSET COUNTY.

BEDMINSTER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Ralph Davenport, Chairman, Pluckemin; John Auble, Secretary, Peapack; Erastus Randale, Bedminster; William Logan, Peapack; Edwin Farrow, M.D., Physician, Peapack.

The health of the people of this township has been excellent during the past year, and no complaint has been made to the Local Board. As I think this speaks well for the locality, I have nothing more to add.

(Signed)

JOHN AUBLE,
Secretary.

BERNARDS TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. A. F. Voorhies, Baskingridge; John Compton, Liberty Corner; William Childs, Baskingridge; William Van Dorne, Baskingridge; J. E. Ballentine, Bernardsville.

The supply of water is from springs and open wells. The water is hard, owing to the limestone formation in this section. The water is pure, unpolluted and usually colorless except during periods of excessive rainfall, when it becomes more or less discolored by surface-water. But few families depend upon cisterns.

Generally speaking, cellars are dry and are kept clean and free from decomposing vegetables, and are properly ventilated.

The township is free from swamps and malarial miasm. Owing to the pure, salubrious mountain air, it is becoming more and more frequented each year as a health resort.

No systematic, yearly house-to-house inspection is practiced; the sanitary welfare of the laity being almost entirely entrusted to the care of the practicing physicians of the township.

No epidemic has prevailed during the year, except a mild epidemic, in the spring, of r  theln.

Slaughter-houses are conducted in such a manner that no complaint has been made during the year.

The Local Board of Health is not well organized. The few sporadic cases of contagious diseases that occur are not as carefully quarantined as the health and safety of the well demand. Parents are often neglectful in the matter of having their children vaccinated in early infant life. Physicians should consider it their duty to impress upon their patrons the importance of this; and also the advisability of revaccination at stated intervals, especially when an epidemic of small-pox occurs in the vicinity.

Fred. C. Sutphen, M.D., Liberty Corner, settled in the township during the current year.

BRANCBURG TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Peter Dumont, Secretary; Theodore J. Starnar, North Branch; Wm. H. Doliver, South Branch; J. B. D. Myres, Readington, Hunterdon county.

We have no special report to make. The Board has not been called upon to act in any case during the year. There have been no epidemics, and people have been as healthy as usual.

(Signed)

PETER DUMONT,
Secretary.

BRIDGEWATER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. A. P. Hunt, Somerville; A. H. Brokaw, Somerville; O. P. Vosseller, Somerville; B. F. Little, Bound Brook; James Dahony, Raritan.

Some of our people are supplied with water from the Raritan river, near Somerville, and others from wells and cisterns. How many take from Raritan river, do not know.

Have no public sewers.

(Signed)

O. P. VOSSELLER,
Secretary.

FRANKLIN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Peter W. Garretson, Weston; George Randolph, East Millstone; Joseph Christopher, East Millstone; P. Eugene Nevius, Assessor, East Millstone.

HILLSBOROUGH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry S. Van Nuys, Chairman, Millstone; W. H. Merrell, M.D., Secretary; Peter Sutphen, Hillsboro; Jacob Nevius, Clover Hill; Adam Hummer, Millstone.

The Board organized May 31st. It has once been called upon. This was to abate a nuisance connected with a slaughter-house. The proprietor at once set to work to render his place inoffensive, when the need of so doing became apparent.

There has been no unusual sickness the past year, and nothing which it seems worth while to mention.

(Signed)

W. H. MERRELL, M.D.,
Secretary.

MONTGOMERY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas Skillman, Chairman, Skillman; William Oppie, Secretary, Harlingen; Peter D. Staats, Griggstown; Cornelius B. Cruser, Plainville; Abm. B. Mosher, M D., Griggstown.

The year just closed has been one of exceedingly good health. No epidemic has prevailed in our midst. The death-rate is very low ; chiefly from old age and paralysis.

The entire township was visited during the months of June and July by me, and I am pleased to say I found no nuisances worth mentioning.

The three slaughter-houses we have are in good condition and are not considered any nuisance in the locality where they exist.

The water-supply is from wells, cisterns and springs, and is generally good.

Houses are mostly inhabited by one family. Very few have basements. In regard to cellars, they are probably not as well drained as they should be ; still, I think the people are taking more pains than formerly to have them so.

(Signed)

WILLIAM OPPIE,
Secretary.

WARREN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joel Codington, Secretary ; Peter J. Zeglio, Physician ; J. J. Lang, Robert Zergiebel, Peter Bowers.

The Township Board of Health did not meet this year.

The township is owned by men who use the land for farming purposes.

The condition of health is good, and the Board did not think it necessary to call any meeting.

(Signed)

JOEL CODINGTON,
Secretary.

SUSSEX COUNTY.

ANDOVER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles W. Roof, Chairman, Newton ; George O. Young, Andover ; Joseph P. Longcor, Andover ; J. C. Clark, M.D., Andover.

Have no incorporated towns. Number of acres in the township, about 14,000.

Have no public nor private water companies. Wells, springs and cisterns afford supply for all domestic uses. Springs principally soft; wells, hard. Large portion of supply obtained from wells and springs; a few abandon their wells and use cistern-water.

No system of drainage. A good deal is being done in the way of open drains, clearing out obstructions from streams and under-drains, and reclaiming waste lands, by our farmers and other land-owners. Much more might be done with profit, both pecuniary and sanitary.

Houses generally have basements or cellars, largely used for winter storage of vegetables and fruit. Very few houses have more than two families.

No sewers. Cesspools generally laid up with stone, dry walls; occasionally one laid in lime and sand; open bottoms. When they become foul, build a new one, rather than clean the old one.

No prevalent nor contagious diseases among domestic animals.

No slaughter-house complaints.

Have one shoe manufactory; been running over two years, employing from fifty to one hundred hands; known as the Andover Shoe Company. The sanitary condition of the building is good; no complaints have been made for any neglect of duty on the part of the company in that respect. The building is well provided with fire extinguishers on every floor.

(Signed)

G. C. COOK,

Assessor.

BYRAM TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel T. Smith, Chairman, Waterloo; Daniel W. Goble, Andover; John D. Lawrence, Stanhope; David Stone, Andover; Dr. C. K. Davison, Stanhope.

Byram township is situated in the county of Sussex, and is bounded on the north by Andover, Green and Newton townships, on the east by Sparta township, and on the south by Lake Hopatcong and Morris county, the Musconetcong river being the line, and on the west by Warren county. The climate is healthy, having a varying thermometer range from sixty to ninety in summer, and from zero to sixty in

winter. Number of square miles, about thirty-one. Number of the population at last census—1885—1,242. Water is pure.

Geological, topographical and general contour mountainous, with little valleys and small streams. The largest is Tubers run, emptying into the great basin of Lake Hopatcong and the Musconetcong river. The villages are Stanhope, bordering on the Musconetcong, and Waterloo, about two miles west of Stanhope, and bordering on the same. The Morris canal runs through both villages. The mountain rocks are mostly of gneiss, with occasional limestone. There is a boundless amount of the white limestone, which crops out in the northern part of the township, and many valuable veins of iron ore, with zinc also.

Lake Hopatcong is the largest body of water on the south, and dividing Sussex from Morris county. Stag pond is a beautiful sheet of water, in the north of the township, flowing about 100 acres. Roseville pond is another beautiful sheet of water, of about 100 acres, on the west, and the Cranbury, on the west, of about 200 acres, and the Bear pond, of about 200 acres, on the south. These two ponds are flowed by the Morris Canal Company for feeders, and one at Stanhope, of about 250 acres. The general water-supply is from springs and wells. All the water is impregnated with iron.

The drainage is natural and rapid; few swamps, and some little malaria occasionally.

Roads good, for mountain regions.

Houses mostly have cellars; very few basements; generally two stories; comfortable and homelike; mostly occupied by owners.

No disease of animals.

Slaughter-houses are kept clean and neat, and located away from the inhabitants.

Schools have been well attended, but the buildings need improvement; children healthy; no public vaccination.

There is but one old burying-ground, and none have been buried in that for a number of years. Of course some die, but they are buried in cemeteries out of the township.

Public health laws are generally observed.

Vital statistics are not very promptly returned.

Health of the township good.

Our Township Board of Health has its meetings at each meeting of the Township Committee, which saves trouble and expense. We have had but one complaint this year, and that was attended to.

FRANKFORD TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Oscar Northrup, Augusta; Elias H. Roe, Augusta; J. C. Price, Branchville; George Phillips, Assessor.

Located near base of Blue mountain. Population, 1,500. Climate, rigorous.

Rolling ground; limestone and shale formation.

Water-supply from wells and springs.

The uneven surface affords good drainage. Have little sewerage.

Have but few streets and no public grounds.

Houses are occupied principally by owners.

Excreta deposited in vaults of loose, unmortared masonry.

School buildings are well ventilated; have good water-closets, and are distinct.

Have one alms-house, the sanitary condition of which is good.

The cemeteries are well regulated.

No violations of sanitary laws.

Registration and vital statistics laws are observed.

But little attention is given to vaccination; is disregarded by School Trustees.

Country houses are generally very well ventilated.

The prevalent disease of the year was pneumonia. The health has been unusually good.

In one or two instances only has the attention of the Board of Health been directed to conditions that could result in nuisances, and then a willingness to comply with the sanitary laws was manifested and the conditions complied with.

(Signed)

GEORGE PHILLIPS,
Assessor.

GREEN TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR**

Wm. O. Gray, Huntsville; George I. Lang, Tranquillity; J. A. Woolfe, Huntsville; Job J. Decker, Tranquillity.

Water-supply from streams, springs and wells.

Have a moderate amount of drainage.

Refuse and excreta are left in the barn-yards for manure.

Have had no contagious diseases among animals.

Have four school buildings—two of frame and two of brick.

Have two cemeteries.

Public health laws and regulations are all good.

No quarantine or vaccination.

Dwellings are heated by wood and coal; windows and doors for ventilation.

No prevalent diseases of the year.

HAMPTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Moses Ackerson, Halsey; A. O. Smith, Halsey; Theodore Harding, Newton; John S. Courson, Newton; Dr. McCloughan, Swartswood.

Water-supply from wells and springs, and, occasionally, from cisterns; quantity abundant; quality good.

Drainage is by open ditches and under-drains for low or meadow lands.

Houses are generally farm-houses; a few tenement-houses, occupied by one family.

The Assessor has not inquired this year, but thinks there have not been any contagious diseases.

No slaughter-houses in the township.

School-houses are in good shape; one room each, and heated by coal fires.

Have one cemetery, which is well cared for and in good shape.

No prevalent diseases of the year, to my knowledge.

HARDYSTON TOWNSHIP

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. H. Ingersoll, Hamburg; Edward Kincaid, Stockholm; Jesse Dennis, Assessor.
One vacancy in the Board.

LAFAYETTE TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

O. P. Armstrong, Lafayette; Sylvester Koyt, Lafayette; Isaac A. Simmons, Lafayette; Nelson Ackerson, Lafayette.

MONTAGUE TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Joshua Cole, Brick House; Electus Shimer, Brick House; Sandford Nearfuss, Tri-States, New York.

The source of water-supply is wells and springs; the water is generally hard and of a limestone nature.

Houses mostly have cellars and are all used to store the winter supply of vegetables. There are no tenement-houses occupied by more than one family.

There is no known or prevalent disease in this town. There has been no loss of animals from contagious disease.

There is but one slaughter-house in the town. It is in a clean and healthy condition.

(Signed)

MATTHEW SHAY,
Town Assessor.

NEWTON TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Charles S. Steele, Newton; Simeon S. Cook, Newton; Patrick O'Neil, Newton; George Hardin, Newton.

SANDYSTON TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Joseph Schooley, Layton; John Rosenkrans, Berans; Mark Sigler, Hainesville.

SPARTA TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

William Strader, Elias Horton, James H. Steadworthy ; T. H. Andress, M.D., Medical Member ; John H. Crawford, Assessor.

The water-supply consists of wells and springs for drinking and cooking purposes, and cisterns for washing. Water in wells and springs generally hard, and considered very pure.

Surface drainage ; the land is generally porous, gravelly soil. Very few swamps in the township, and those quite small.

Ogdensburg, a village in the north end of the township, near the zinc mines, used to complain of the existence of chills and fever a few years ago, but do not hear much about it lately ; it was generally believed that the fresh material from the mines caused it.

Houses all have cellars ; used for storing vegetables for family use.

Slaughter-houses are never inspected. There are three in the village of Sparta. In the summer time the smell in the neighborhood is very disagreeable, and there is considerable talk about it, and fault-finding. In the spring of 1888, scarlet fever broke out among the children, but the only deaths were two children in one family.

STILLWATER TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

W. E. Decker, Swartswood ; Jesse Sherred, Swartswood ; Geo. C. Huff, Middleville ; Edwin Wintermute, Middleville ; John S. Obdyke, Stillwater ; C. V. Moore, Stillwater.

Water-supply from wells, springs and cisterns ; on limestone, hard ; on slate, soft.

There are some swamps, and some cases of malaria ; not as much the past year as some others.

Most all houses have cellars, and some basements. The basements are occupied. The cellars are used for storage of vegetables.

No known or prevalent disease. The Assessor has inquired, but has not heard of any loss of animals from any contagious disease.

There have been no complaints made to the Board the past year.

(Signed)

J. S. OBDYKE.

VERNON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Carlos Allen, M.D., Vernon; A. S. Blanchard, Assessor, Vernon; Stephen Wright, McAfee Valley; Nicholas Farber, Vernon; Lewis Martin, Glenwood.

The township of Vernon is located on the northeast corner of New Jersey, and is a rather mountainous district, with a valley running through the center of it and with a stream of water running through the same.

The water-supply is from wells and springs, and we find them both hard and soft.

As to drainage, there is but little of it done in this township. As a general thing, the cellars are dry. No swamps, to create malaria.

There are no prevalent diseases among animals.

No slaughter-houses in the township.

There are no manufactories to cause any evil to health.

The population in 1885 was 1,855.

There are ten school-houses, in good order.

(Signed)

A. S. BLANCHARD,
Assessor.

WALPACK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. W. Bunnell, Clerk, Walpack Centre; Philip S. Rosenkrans, Flatbrookville; John B. Fuller, Flatbrookville; Wm. T. Smith, Bevans.

The water-supply is chiefly from springs and wells; mostly hard water; very few cisterns.

As to drainage, there is no system. Cellars generally dry. Very little swampy land. No malaria.

Houses all have cellars, which are largely used to store vegetables. No house is occupied by more than one family.

No prevailing disease, the health of the people being uncommonly good, only two deaths having occurred in the last nine months. No disease among animals.

There is no slaughter-house in the township.

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There is no resident physician in the township at the present time, Dr. Frank Beers having removed from Flatbrookville to Bushkill, Pennsylvania.

(Signed)

J. W. BUNNELL.

WANTAGE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

N. Hall, Clerk, Deckertown; Jonathan Coykendall, Deckertown; S. M. Parcel, Deckertown; Warren Clark, Beemersville; Alex. Williamson, M.D., Physician, Deckertown.

The water-supply is almost entirely from wells and springs; a very few use cisterns. In this village (Deckertown) there are a number of bored wells, water being reached at a depth of twenty to ninety feet, the water soft, abundant flow and good quality. In my former report I spoke of the location of one well, and since that I have noticed a coating, yellowish-brown, on sides and bottom of vessels in which the water was kept.

There is no system of drainage. The water-level is such that all cellars are comparatively dry. Nearly one-fourth of the area of the township is swamp, but malaria, which has been prevalent in former years, is now hardly heard of.

Houses do not generally have basements, but all have cellars, which are largely used for storing vegetables of all kinds. I know of no houses of more than two families.

There has been no prevalent disease in the township this year. In one family there were four deaths from diphtheria, which was supposed to have originated from the well.

There have been no contagious diseases among animals; a few deaths have occurred from tuberculosis, but across the line, in Orange county, pleuro-pneumonia is now prevalent.

Slaughter-houses are cleaned and properly disinfected. Have heard but one complaint, and the cause was promptly abated.

Within the year a shoe factory has been started, that gives employment to about thirty operatives, the sanitary condition of which seems to be all that can be desired.

(Signed)

N. HALL,

Assessor.

UNION COUNTY.

CLARK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. H. Enders, Chairman; Max Reifee, Lewis Smith; F. P. Bullman, Assessor; Dr. W. E. Cladek, Medical Member.

Water is obtained entirely from wells and cisterns; some wells furnish hard water and others soft, and all good throughout the year.

The drainage is mostly by natural means. Two branches of the Rahway river flow through the township. A few open ditches and a few underground drains afford all the means of drainage.

The houses are all frame, having cellars, which are used for the storage of fruits and vegetables. There are two large tenement-house rows, which accommodate about twenty families. There is no yearly house inspection.

(Signed)

F. P. BULLMAN.

ELIZABETH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John W. Whelan, President; Wm. M. Mack, M D., 36 Third street; D. M. Miller, M D., 1025 East Jersey street; John J. Donahue, 121 Marshall street; Wm. Birnie, Jr., 210 West Jersey street; E. L. P. Coleman, 319 Marshall street. E G. Putnam, Health Inspector, Sheridan House.

Water-supply from natural lake (Ursine); supplied by private company. Two thousand four hundred houses take water. Water seldom discolored; no iron or other taste; soft water; sometimes muddy, after storms. Pipes supposed to be cleaned regularly. No sewage above supply. Examinations made as to pollution. Quantity sufficient; quality fair.

Drainage is by surface gutters. Dry cellars in upper portion of city; in the lower portion many of the cellars are damp and some have water constantly in them. Malaria not very frequent, and confined to no certain locality. Sewers, brick; branch-pipes, fifteen or eighteen inches—fall, about one foot to one hundred; main sewers

less; outflows, in Sound and Elizabeth river. Ventilation, perforated man-holes.

A large proportion of houses have cellars; some have basements, but not generally occupied. No yearly house-to-house inspection.

Sewers are used. Cesspools not generally cemented; mostly close wooden boxes; emptied by patent machine; removed to alms-house farm, outside city limits.

Glue-works, said to be evil to health, are to be removed. No other manufactories evil to health.

Have four public schools and one high school; another public school building in course of erection, to cost about \$22,000, will be ready for occupancy in the spring. The ones now in use are heated by steam, with closets, in good order, outside. The building under construction will have the patent dry apparatus for use in the place of water-closets.

Have one alms-house, one general hospital, and several charities carried on by societies and private individuals.

Have three cemeteries—Evergreen, Mount Olivet and St. Mary's.

State public health laws adopted, and a Sanitary Code for the city adopted August, 1882.

Births, deaths and marriages are recorded. There has been reported to this office the following number of contagious diseases for the year: Diphtheria, 93; scarlet fever, 51; small-pox, 13; measles, 13; whooping-cough, 3; mumps, 1; chicken-pox, 8; croup, 2; typhoid fever, 9.

Quarantine strictly enforced. City Physician vaccinates indigent children free, and vaccination is enforced in public schools.

Sanitary expenses were \$4,500.

A large proportion of dwellings are heated by stoves, some by steam, and the balance by furnaces. Ventilation depends upon chance.

FANWOOD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Kyte, Scotch Plains; L. W. Miller, Scotch Plains; Wm. Terry, Plainfield; John Robson, Scotch Plains; F. W. Westcott, M.D., Scotch Plains.

Board of Health report questions same as answered last year. We have had a quiet year; only two complaints and these quickly cor-

rected. Have had no epidemics, and in fact very little sickness. Very few cases of malaria.

(Signed)

F. W. WESTCOTT,
Secretary.

LINDEN BOROUGH.

NAMES AND POST-OFFICE ADDRESSES OF MEMBERS AND HEALTH INSPECTOR.

Alex. R. Corbett, Linden; Ferd. Blancke, Linden; Edwd. Gulager, Linden; John A. Etheridge, Linden; M. Clay Lowdon, Linden; Victor Mravlag, M.D., Medical Adviser, Elizabeth.

Drinking-water entirely obtained from wells; water hard. All houses are supplied with cisterns, from which they obtain their supply of rain-water.

Our drainage is considered good. A few of the streets are laid with twelve-inch pipe connecting with a sewer (brick) emptying into West brook, a running stream the year round, whose outlet is the Rahway river. There are no low or swampy lands within the limits of the borough. Cellars usually dry, except during heavy storms, when some few of them have water in them, but upon the cessation of the storm the water runs off at once. Cesspools are generally used for sink drainage from kitchens, which are emptied every three months and carted away.

The excreta from privies are carried away in closely-boxed wagons made for that purpose, and used as fertilizers.

We have no contagious disease of animals. There are no diseases prevalent among the human family within the borough. Have not been troubled with malaria the past year. In fact, the residents of this section have been unusually healthy.

(Signed)

M. C. LOWDON,
Health Inspector.

LINDEN TOWNSHIP.

During the past year the general health and condition of the township has been excellent. No epidemic has occurred. A few sporadic cases of scarlatina and diphtheria have taken place, and in every instance have been confined to their original locality. Quarantine and

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other measures for the protection of the people are strictly carried out in all such cases.

Malarial diseases have been very infrequent and mild.

Vaccination very generally performed.

Buildings (dwellings), as a rule, are well constructed, with cellars underneath.

(Signed)

H. C. PIERSON, M.D.,

Roselle.

NEW PROVIDENCE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John M. Badgley, New Providence; Samuel R. Valentine, New Providence; Maxwell F. Drake, Murray Hill. John W. Dickinson and A. M. Cory, M.D., New Providence, Health Inspectors.

Water-supply is from wells and springs.

Drainage mostly natural.

Streets in fair condition. No public grounds.

Most of the houses are owned by their occupants, with only one family in each; they have cellars.

In the disposal of excreta and refuse, each one looks after his own interests.

There were no diseases of animals reported by the Assessor.

No manufactories.

There are three schools, all in good order; no public buildings.

No alms-houses or other charities.

There are three cemeteries in the township.

The health laws are strictly enforced.

Registration and vital statistics are properly attended to.

Our ordinances are sufficient, and the Board is ready to enforce them if necessity requires.

The officers so far have given their time gratuitously.

PLAINFIELD.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George W. Rockfellow, President, Plainfield; Oliver B. Leonard, Secretary, Plainfield; Stephen A. Ginna, Plainfield; Lemuel W. Serrell, Plainfield; Charles H. Penfield, M.D., Plainfield.

To the State Board of Health:

GENTLEMEN—Within the past year this Board of Health has been fully organized under the State law, and by virtue of a city ordinance. The members proceeded at once to formulate a Sanitary Code, and held meetings every week for three months, to consider the matter. Six ordinances were adopted, embracing the following objects, which are designed to cover all necessary requirements: 1st, relating to marriages, births, deaths and burials; 2d, relating to contagious diseases; 3d, relating to food and drink; 4th, relating to nuisances; 5th, relating to kitchen garbage, swill and offal; 6th, relating to privies and cesspools. By-laws were also passed, and a competent Health Inspector appointed, who commenced at once a diligent inquiry and thorough investigation into the healthfulness of the city. He has made 724 inspections from house to house and yard to yard, and by his directions cesspools have been emptied and disinfected, and privy-vaults cleaned out, to the number of 204.

An ordinance was early adopted, regulating the proper disposal of garbage and swill. The householders generally have conformed to the system, and twice a week the refuse matter has been removed by regularly-licensed scavengers. There have been 260 orders issued for the abatement of nuisances, under this ordinance.

On account of these timely precautions and other needful remedies, there has been but little sickness of a preventable character. The general health of the city has been unusually good, and no epidemic has afflicted the inhabitants. Two or three cases of malignant diphtheria, brought into the place by strangers, were successfully managed by the Health Inspector and City Physician. Fumigation and thorough disinfection of the premises and destruction of bedding, &c., exposed to the contagion, prevented any additional harm.

The registration of vital statistics has been generally observed.

The establishment of a large cemetery (known as the "Hillside Cemetery"), just outside the corporate limits, will be a great benefit to the future healthfulness of the city. The number of interments in the five old grave-yards located in different wards, is decreasing every year.

The Board has not been called together for any especial trouble or complaint of nuisances. The thorough investigation of all premises within the older and more thickly-populated parts of the city, has resulted in the maintenance of cleanliness never obtained before.

(Signed)

OLIVER B. LEONARD,
Secretary.

RAHWAY.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Dr. Elihu B. Silvers, President; H. B. Rollinson, Willet Denike, W. E. Cladek, M.D., John M. Tufts, Jr. Chas. H. Lambert, Health Inspector.

Our report, under general heads, is about the same as last year. The general health of the city has been good, with a large percentage of the deaths either among children under the age of one year or persons over sixty years of age. We have had some contagious diseases, including one case of small-pox, the patient being a child. The family was quarantined as soon as reported, and the nearest neighbors did not know that the disease was in their proximity until the house was placarded. We have also had cases of diphtheria and scarlatina, confined mostly to small children, and seeming to be of a mild form, with but few deaths.

The attention of our Board has been given, to some extent, to compel private property-owners to properly drain their lands, where private dwellings are erected. We have met with fair success, and have no doubt that in time a great benefit will be derived from said drainage. We have had a large number of nuisances reported during the year, which were, in most cases, abated without trouble; we have not had to take a single case into the police court up to the present time, December 5th, 1888.

(Signed)

CHAS. H. LAMBERT,
Health Inspector.

SPRINGFIELD TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

J. J. Hoff, Springfield; H. M. Graves, Springfield; A. P. Carter, Springfield; Geo. Secor, Springfield. Dr. N. C. Jobs, Health Inspector, Springfield.

Water-supply from wells, cisterns and streams.

Cellars usually dry. Some are wet in spring of the year, owing to swampy ground.

SUMMIT TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Geo. Manley, Summit; Chas. Robbins, Summit; J. Pheasant, Summit; S. R. Mullen, Summit.

Our water-supply is entirely from wells.

There is no regular system of drainage; in most cases, however, cemented and ventilated cesspools are in use. Cesspools are emptied entirely by odorless sanitary wagons.

The township is well lighted by gasoline, which has given universal satisfaction. A system of electric lights is also in process of construction.

There have been no prevalent diseases during the past year; the health of the population has been exceptionally good.

Houses are generally provided with cellars, but as a rule are kept clean and dry.

(Signed)

S. R. MULLEN.

UNION TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

James B Woodruff, Roselle; John Leonard, Union; William A. Allen, Hilton, Essex county; D. Hobart Sayre, Union.

Our water-supply is derived from wells and running streams, and has this year been more than abundant.

But one complaint of nuisance has reached us, which the Board promptly acted on and abated.

Have had several notifications of contagious diseases, but no case that required action on our part, as the parties took all needful precaution and isolation.

Several cases of diphtheria have occurred, about one-half of which proved fatal. The disease was at four widely-separated points, in as many different school districts, and where the disease was contracted or what the cause was, is the mystery.

(Signed)

D. HOBART SAYRE,

Secretary.

● **WESTFIELD.**

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Kilbourne Tompkins, Westfield; James L. Miller, Westfield; Joseph R. Connolly, Westfield; John McMaul, Assessor, Westfield.

WARREN COUNTY.

ALLAMUCHY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel G. Parks, Allamuchy; Samuel Drake, Allamuchy; William V. Axford, Allamuchy; John N. Hibler, Assessor, Allamuchy.

BELVIDERE BOROUGH.

Have at present no legal Board of Health.

(Signed)

J. M. SNYDER,
Town Clerk.

[NOTE.—This is an example of a town well located, but suffering in its reputation for healthfulness, by reason of defective health administration.—SECRETARY.]

BLAIRSTOWN.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John I. Blair, Blairstown; Samuel Linnaberry, Blairstown; Nathan S. Smith, Blairstown; R. B. Andress, Assessor, Blairstown.

FRANKLIN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Hazzard, Asbury; John Baylor, Broadway; William Pursel, New Village; Wm. M. Vliet, Assessor, Asbury.

FRELINGHUYSEN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

L. J. Howell, Hope; Levi C. Howell, Johnsonsburg; J. W. Hart, Johnsonsburg; F. Rorbach, M D., Johnsonsburg; N. D. Vashbinder, Assessor, Johnsonsburg.

This township is supplied by running streams of fresh water, and springs and wells supply the people.

No sewerage. Low lands quite well drained by use of tiles. Nearly all cellars can be drained with proper care. No malaria.

Houses mostly have cellars; commonly used for the storage of vegetables. No inspection.

No contagious diseases among animals, except hog cholera. The loss in this town was very heavy last year, but very light this. But few farmers sustained losses this year.

No slaughter-houses in township.

No manufactories.

School-houses most all new or lately repaired. All well ventilated. No grounds for complaint.

GREENWICH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Sherrer, Secretary, Bloomsbury; William Shipman, Phillipsburg; B. K. Stone, Stewartsville; R. I. Smith, Bloomsbury; P. F. Hulshizer, M D., Stewartsville.

Have nothing to report in the way of any special disease in the past year. We have had only the diseases usually prevailing in all communities.

[NOTE.—A full account of an outbreak of pleuro-pneumonia was reported to the State Board, and proper steps were at once taken to prevent its spread.—SECRETARY.]

HACKETTSTOWN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thos. Nolan, Clerk, Hackettstown; Dr. J. S Cook, Hackettstown; Dr. Theo. Crane, Hackettstown; Dr. A. E. Martin, Hackettstown; Wm. M. Everitt, Hackettstown; Wm. F. Shields, Hackettstown; Chas. J. Reese, Hackettstown; C. N. Wade, Hackettstown.

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Our water-supply is from a mountain spring rising on Schooley's mountain, and is brought to the town by iron pipes. It is soft water. The reservoir has been thoroughly cleaned and repaired this year. No discoloration from rains.

No sewerage, and the drainage is natural.

Streets are kept cleaned.

Nearly all the houses are two and a half stories, and rarely over two families in them.

The streets are lighted by electricity.

Most of the cesspools have open sides and bottoms.

Our markets are kept clean.

No diseases of animals.

Slaughter-houses are kept clean, and no complaints have been made against them.

We have one silk mill running, and it is in good condition.

The public school is well ventilated, and the scholars are healthy. Also, the seminary is in good condition.

Have no charitable institutions in the corporation.

Only one policeman and a small jail.

There are no fire-escapes except on the seminary.

The cemetery is well cared for.

The general public health is good.

There have been no prevalent diseases this year.

(Signed)

THOMAS NOLAN,
Clerk.

HARMONY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Roderic Vannatta, Roxbury; James W. De Witt, Harmony; Robert Kinney, Harmony; Asa K. Cole, Montana; J. D. De Witt, M.D., Harmony.

The Board of Health has not been called together during the year to act upon any complaint. There was an epidemic of diphtheria during the month of October, resulting in three deaths, two occurring in one family. The general health of the township during the year has been good, although several deaths have been reported.

(Signed)

J. D. DE WITT, M.D.

HARDWICK TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Isaac S. Vass, Chairman, Marksboro; David B. Newman, Blairstown; Hiram France, Blairstown; Marcus C. Hill, Assessor, Blairstown.

The blanks sent me in October were not filled up, because there is no Local Board of Health in this township, acting as such.

There have not been any contagious or prevalent diseases during the past year.

(Signed)

MARCUS C. HILL,
Blairstown, Assessor for Hardwick Township.

HOPE TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Edgar C. Howell, Chairman, Hope; Dr. Miller, Township Physician and Secretary, Hope; Geo. Dupue, Mount Hermon; James Fleming, Danville; John R. Hartung, Assessor, Delaware Station. Dr. Miller was elected to fill the unexpired term of Dr. A. L. Gibbs.

INDEPENDENCE TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Aaron B. Leigh, Danville; W. J. Barker, Vienna; Andrew Seimanton, Vienna; John Merrell, Assessor.

Most houses are built with cellars, which are largely used in winter for storing vegetables.

Very few houses have more than one family, to the best of my knowledge. There is no house inspection.

There has been no prevalent disease or epidemic during the year.

KNOWLTON TOWNSHIP.**NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Lewis C. Weller, Clerk, Columbia; Samuel Bogart, Delaware Station; William B. Moore, Columbia; Jeremiah Hiles, Knowlton; Ephraim Dietrich, Columbia; Robert Bond, M.D., Knowlton.

Water is supplied mostly from wells and cisterns, but there are some of the inhabitants who use springs. The water is both hard and soft, depending upon the situation; most of the well-water is hard.

There is no system of drainage used here; it is all natural drainage. There are quite a number of swamps, but not as much malaria as formerly.

There are no streets or public grounds.

The houses generally have cellars, which are largely used for the storage of vegetables. There are no tenement-houses containing two families, and there is no inspection.

Most of the cesspools are built with open sides, and the contents are emptied upon the land.

There are no markets.

The cholera has been epidemic among swine in this and adjoining township for the last year, causing a great loss among the pork-raisers. I do not know whether the Assessor makes inquiries into the losses of animals or not, but I presume he does.

There are no slaughter-houses in the township.

There are no manufactories in this township from which evil to health could result.

The school-houses are generally in good condition, although some are really too small for the number of scholars.

There are no alms-houses, hospitals or charities in this township.

No police or prisons.

No fire-guards or escapes.

There are four cemeteries in this township, all in good condition and well attended to. I know of no opportunity for them to affect the health of the community at the present time.

All laws and regulations for the benefit of the health of the community are well observed in this township. All particular or special matters are attended to at once by the Local Board.

The law in relation to registration and vital statistics is complied with.

There have been no contagious diseases in this township for the last year needing the interference of the Board, but I think that there are a great many in the township who are neglecting vaccination. It may cause trouble sometime, unless attended to.

There are no sanitary expenses.

Dwellings are generally heated by stoves. Ventilation good.

There has been no prevalent disease in this township in the last year, but in the neighboring townships of Hope and Frelinghuysen there has been a considerable epidemic of putrid sore throat.

(Signed)

ROBERT BOND, M.D.

LOPATCONG TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jeremiah Yeisley, Secretary, Phillipsburg; Edwin H. Paulus, Phillipsburg; Robert D. Melroy, Phillipsburg; George G. De Witt, Phillipsburg; L. D. Bieber, Physician, Phillipsburg.

There is no change in the description of the township as regards drainage, &c.

The Board have been called in but one instance only, on account of burying carcasses of dead animals by the side of running water which is used for domestic and other purposes. The case was immediately attended to, and, I think, was a case of thoughtlessness on the part of the violator of the law. The general health of the township is good. There have been no prevalent diseases. I think there was one case of typhoid, and that did not result fatally. There have been no diseases among cattle, and, as a whole, the health condition in the township has been all that could be expected under any circumstances.

(Signed)

JEREMIAH YEISLEY,
Secretary.

MANSFIELD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. S. Apgar, Stephensburg; Nicholas Martenis, Karrville; Robert M. Thomas, Port Murray; James Beaty.

OXFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Lommason, Belvidere; John S. Banghart, Buttzville; Geo. A. Wildrick, Oxford; Michael Mountain, Oxford; L. B. Hoagland, Oxford.

Diphtheria has been prevalent in our township during the year, there having been in all about 75 cases, with, perhaps, 15 deaths.

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Six or seven years ago we had a similar epidemic, starting in the same vicinity, probably due to damp cellars and personal filth.

Have had a number of cases of pneumonia in children, with meningitis as a sequel. There were a number of deaths from this cause.

(Signed)

L. B. HOAGLAND, M.D.,

Secretary.

PHILLIPSBURG.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Chas. McClary, President, Phillipsburg; ——— Brakely, Clerk, Phillipsburg, Dr. Jacoby, Phillipsburg; George Flemmings, Phillipsburg; Isaac Miller, Phillipsburg; Jerome Durling, Phillipsburg; B. Frame, Phillipsburg. S. B. Burwell, Health Inspector, Phillipsburg.

There is an abundant supply of spring-water.

Drainage and sewerage are poor—of no account.

Refuse, garbage, &c., are placed on public dumping-grounds by each one doing his own hauling; no special management.

Slaughter-houses are in good condition.

Public school-houses are provided with fire-escapes; none others in the town.

Public health laws and regulations are not observed as they should be by the inhabitants.

PAHAQUARRY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William O. Vancampin, Daniel M. Depue, Ambrose Vancampin; Jason K. Hill, Assessor.

POHATCONG TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob O. Boyer, Secretary, Finesville; David Frace, Shimers; Isaac Case, Warren Paper Mills; Nathan Case, M.D., Reigelsville; A. C. Albright, M.D., Springtown.

Water is obtained from springs, wells and cisterns.

No drainage, except natural.

There has been no disease among animals.

Only one slaughter-house.

Manufactories consist of one paper mill and three grist mills.

There are five stores.

Public health cared for by Local Board of Health.

Some diphtheria, typhoid fever and malaria this year.

WASHINGTON BOROUGH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Cushing, Secretary, Washington; Wm. M. Stiles, M.D., Washington; George Campbell, Washington; John Hornbaker, Washington; Levi Bowlby, Washington; George Dawes, Washington. Frank P. McKinstry, M.D., Health Inspector, Washington.

The source of our water-supply was quite fully treated of in the last report. As the water is gathered from two mountain streams which take their origin in springs not far above, there is but little danger of sewage contamination. There are no wells in use in town, but probably one-half of the houses are supplied by cisterns.

There is no system either of drainage or sewerage. The water-level in some localities is so near the surface as to insure damp cellars.

The tenement-house evil is one with which we are not afflicted. There is no system of house-to-house inspection. Inspections are ordered only upon complaint being made to the Board in a proper manner.

Cesspools are usually built with open bottoms and but seldom emptied.

Slaughter-houses are not inspected unless complaint is made to the Board.

There has been no special prevalence of sickness during the past year.

(Signed)

F. P. MCKINSTRY, M.D.,

Inspector.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. Miller, Secretary, New Hampton; Frank Tinsman, Washington; Jacob Castner, Changewater; ——— Gibson, Port Colden; Thomas Martin, Washington.

Washington township is situated in the southeasterly portion of Warren county. It contains but two small towns, except borough of Washington, it being a farming district.

The water-supply is from wells, springs and cisterns, mostly the latter.

The houses are comfortable wooden structures, with cellars; very few, if any, basement kitchens.

Kerosene lamps are mostly used as a light.

This year the animals have been unusually free from disease.

There are no manufactories and but very few with trades. Almost all depend upon the produce of soil for their living.

The school-houses are neat, comfortable, well lighted and heated, and equal, if not better, than any in surrounding country.

The past year has been comparatively healthy, having had but one slight epidemic of diphtheria in northern part, with few deaths.

We have at present no Health Inspector. Owing to the healthy condition of our township it has not been considered necessary by the Board.

(Signed)

WILLIAM MILLER,
Secretary.

HEALTH LAWS AND CIRCULARS.

HEALTH LAWS.

A reference to legal opinions will be found on pages 52–55 and page 212 of this report.

A list of all former laws to 1888 relating to health is given in Circular LX. of this Board.

The following is a list of the laws relating to public health as enacted by the Legislature of 1888 :

LAWS OF 1888.

Chapter XIII.—A Further Supplement to an act entitled “An act to provide for drainage and sewage in densely-populated townships in which there is a public water-supply,” approved March fourth, one thousand eight hundred and eighty-four.

Chapter XIX.—An Act concerning the construction, care and improvement of the public ways, parks and sewers in certain of the cities of this state, and assessments for the same.

Chapter XXXIX.—An Act to secure in this state the certification of marriages, births and deaths, and of the vital facts relating thereto, and to provide for the record thereof.

Chapter XLIX.—A Supplement to an act entitled “An act providing for sewerage in and by adjoining cities, towns and townships,” approved April twenty-first, one thousand eight hundred and eighty-seven.

Chapter LVI.—A Supplement to an act entitled “An act to establish in this state boards of health and a bureau of vital statistics, and to define their respective powers and duties,” approved March thirty-first, one thousand eight hundred and eighty-seven.

Chapter LXXI.—Supplement to an act entitled “An act to establish in this state boards of health and a bureau of vital statistics, and to define their respective powers and duties.”

Chapter CV.—An Act in relation to practicing physicians.

Chapter CXXII.—A Supplement to an act entitled “An act respecting the cutting of ice in cities of this state, and giving to boards of health in such cities power to regulate and control the same,” approved March eighteenth, one thousand eight hundred and eighty-five.

Chapter CXXXV.—A Supplement to an act entitled “An act for the construction, maintenance and operation of water-works, for the purpose of supplying cities, towns and villages of this state with water,” approved April twenty-first, one thousand eight hundred and seventy-six.

Chapter CXXXIX.—A Further Supplement to an act entitled “An act to provide for drainage and sewage in densely-populated townships in which there is a public water-supply,” approved the fourth day of March, anno domini one thousand eight hundred and eighty-four.

Chapter CXLIV.—An Act respecting the confinement of persons under the age of sixteen years detained in the jails, work-houses, penitentiaries and other places of confinement in the several counties of this state.

Chapter CXLIX.—Supplement to an act entitled “An act to provide for the better security of life and limb in cases of fire in hotels and other buildings,” approved March seventeenth, one thousand eight hundred and eighty-two.

Chapter CLXIV.—A Further Supplement to an act entitled “An act to provide for the drainage of lands,” approved March eighth, in the year of our Lord one thousand eight hundred and seventy-one.

Chapter CCI.—A Supplement to an act entitled “An act to enable cities to build main sewers in certain districts, and to acquire private lands for that purpose,” passed March twenty-fourth, one thousand eight hundred and eighty-five.

Chapter CCL.—An Act to authorize any of the municipal corporations of this state to contract for a supply, or a further or other supply of water therefor.

Chapter CCLX.—A Supplement to an act entitled “An act to enable cities to build main sewers in certain districts, and to acquire private lands for that purpose,” passed March twenty-fourth, one thousand eight hundred and eighty-five.

Chapter CCLXXXIX.—An Act to authorize incorporated towns to construct sewers and drains, and to provide for the payment of the cost thereof.

CIRCULARS.

The lists of all former circulars issued by this Board are to be found in the sixth and eleventh reports. All circulars have been printed in some one of the reports, except Circular LX. in regard to the laws, which has been omitted on account of its length and is sent on request.

The following circulars have been issued this year :

CIRCULAR LXV.

OF THE

NEW JERSEY STATE BOARD OF HEALTH.

CONSTRUCTION, PLUMBING, VENTILATION AND DRAINAGE OF BUILDINGS AND OUTSIDE CON- NECTIONS THEREOF, AS REGULATED BY LOCAL BOARDS OF HEALTH.

(The last Legislature passed the Plumbing law. Chapter LVI., Laws of 1888. See, also, last report.)

Ordinances relating to this can be passed by all Boards of Health, except those of townships. The law goes into operation July 4th,

1888. In its sanitary bearing it is one of the most important laws ever passed in this State. All health authorities recognize the house as the sanitary center and all else imperfect until its sanitary condition is secured. Clear up surroundings and remove nuisances as we may, we do not succeed until there is such sanitary control of the house as secures good drainage, the proper removal of refuse and such delivery of all liquids to be removed through pipes as prevents foul air and hidden deposits. Hence it is that London and other English cities make right construction of dwellings and proper housing of the people the advance idea in sanitary progress. Hence it is that New York, Chicago, Boston and Philadelphia are so much considering this subject. So, it is wise that this State acts instead of talks, and has put it in the power of every town and city to exercise this sanitary control.

In order that there might be some uniformity of direction and action, so soon as the law was passed the Secretary of the State Board called a conference of a few health officers and plumbers of the State, at Trenton. The chief design was to agree upon what regulations were feasible to be required by our City Boards and to secure uniformity as far as practicable. At this, and a subsequent meeting at Newark, there were present D. L. Wallace, M.D., Health Officer, of Newark ; E. Dunn, plumber, of Newark ; H. R. Baldwin, M.D., President of Board of Health of New Brunswick ; Mr. Hammond, plumber, of Camden ; Wm. K. Newton, M.D., Health Officer, of Paterson ; J. T. Anderson, plumber, of Trenton ; E. G. Harrison, C.E., Asbury Park, and various other gentlemen. Consultation was had on special points with acknowledged authorities, and various regulations, forms and specifications used in other cities were compared.

As a result, we recommend the following regulations as wise for adoption and as fitted to form the basis with plans and specifications for the various cities :

MODEL FOR CITIES FOR ORDINANCES TO CONFORM TO THE LAW
(CHAPTER LXV., LAWS OF 1888).

Supplement to the Code of the _____ of the city of _____,
regulating the plumbing and drainage of buildings.

Be it ordained by the Board of Health of the city of _____ as follows:

Section 1. Every person engaged in the business of a master and foreman plumber in the city of _____ shall appear in person at the office of the Board of Health and register his name, residence and place of business (blank forms to be furnished for this purpose), and in case of removal to make change in said register accordingly.

Sec. 2. Before any portion of the plumbing and drainage system of any building shall be constructed, there shall be filed in the office of the Board of Health a plan thereof, signed by the owner, showing the said plumbing and drainage system entire, from its connection with the sewer, cesspool or vault throughout the entire building, together with the location of all fixtures, traps, ventilating-pipes, &c. Said plan must be approved and the name of the plumber attached thereto before any portion of the work shall be executed. Before any changes are made in the direction of pipes or location of fixtures they must first be approved, and said changes made on the original plan on file. This regulation also applies to any extensions or alterations of existing systems, with the addition that in such cases a plan of the old system, as well as a plan of the proposed changes, must be filed in the office of the Board of Health. Drawings and descriptions of the plumbing and drainage of buildings erected prior to the passage of this regulation may be placed on file in the office of the Board.

Sec. 3. When the plan of any plumbing and drainage system is filed in the office of the Board of Health a fee of two dollars will be charged to defray the expenses of inspecting the plans, of filing and superintending the testing of the work, as provided in Section 40.

Sec. 4. The Health Officer shall be notified promptly by the plumber when the plumbing and drainage work of any building, or any portion thereof is completed and ready for inspection and testing. All inspections and testings shall be made as soon as possible after such notification. Any such system put in and covered without due

notice to the Health Officer must be uncovered for examination at the direction of said officer.

Sec. 5. No building or premises will be allowed to be connected with any sewer, cesspool or vault without a permit first obtained from the Board of Health; and it is further required that permits shall be kept on hand during the progress of the work to which they relate, and that they shall be exhibited whenever required by the proper officers of the Board. The condition of this permit must be strictly complied with. This regulation applies to all sewers, whether on private property or in public streets or alleys. Before laying the drain from the building to the sewer, cesspool or vault, and after the trench is graded, the bottom of the trench must be carefully rammed, to avoid unequal settling of the drain. After the pipe is laid, as the trench is filled, the earth must be tightly rammed as near as possible to its original compactness. Tunneling is prohibited.

Sec. 6. When the ground is made or filled in, the drain extending from the sewer, cesspool or vault to the foundation wall must be of extra-heavy cast-iron pipe, of such diameter as may be approved. Such pipes should be laid with the joints properly caulked with lead.

Sec. 7. Where the soil consists of a natural bed of loam, sand or rock, the drain may be of hard, salt-glazed and cylindrical earthenware pipe, laid on a smooth bottom, free from all projections of rock. Each section must be wetted before applying the cement, and the space between each hub and the small end of the next section must be completely and uniformly filled with the best hydraulic cement. Care must be taken to prevent any cement being forced into the drain to become an obstruction. No tempered-up cement shall be used. A straight-edge must be used inside the pipe, and the different sections must be laid in perfect line on the bottom and sides.

Sec. 8. Where a building is to be connected with a sewer, cesspool or vault it must be connected by a drain not less than four inches in diameter, having a fall of not less than one-quarter of an inch to the foot. Old drains can be used for new houses only when found by an Inspector of this Board to conform in all respects to the foregoing regulations governing new drains.

Sec. 9. Where there is no sewer in the street on which a building faces, and it is necessary to construct a private sewer to connect with a sewer on an adjacent street or avenue, it must be laid outside of the

curb, under the roadway of the street, and not through yards or under houses, without a special permit from the Board of Health.

Sec. 10. Pipe sewers must not be cut; house-drain connections with pipe sewers must be made with Y branches. Where connection is made with brick sewers, a terra-cotta junction-block must be used.

Sec. 11. All horizontal drains within and to a distance of six feet beyond the walls of buildings shall be of cast iron, with caulked, leaden joints, or wrought-iron screwed joints, and shall be so located as to be readily accessible for inspection. The house drain within buildings shall be securely hung on the cellar wall or properly suspended from the cellar ceiling, unless this is impracticable, in which case it must be laid in a trench cut at a uniform grade, the bottom of which must be covered with hydraulic concrete, and walled upon the sides with brick laid in hydraulic cement; said trench must also be provided with movable covers. The house drain shall have a fall of at least one-quarter inch to the foot, and more if possible. When a pipe passes under the wall of a building there shall be a relieving arch, to prevent the pipe being broken by settling of the foundation. Said drains shall be provided with openings for cleansing purposes, the same to be closed by screw plugs.

Sec. 12. A running or one-half S trap must be placed on the house drain at an accessible point near the house-wall. This trap must be furnished with a hand-hole for convenience in cleansing, the cover of which must be properly fitted, and made gas and air-tight with some suitable cement, properly applied.

Sec. 13. Every house drain shall have an inlet for fresh air, not less than four inches in diameter, entering on the house side of the trap and leading to the outer air, opening at some place shown on the approved plans, not less than ten feet from the nearest window. No cold-air box for a furnace shall be so placed that it can by any possibility draw air from this inlet pipe.

Sec. 14. All cast or wrought-iron pipes must be sound, free from holes, and when laid under ground shall have a uniform thickness of one-quarter of an inch; when placed above ground said pipes shall have a uniform thickness of one-eighth of an inch. Where the building is over sixty feet high above the curb, pipes of the following weights shall be used, with extra-heavy fittings:

2-inch, 5½ pounds per lineal foot.

3-inch, 9½ pounds per lineal foot.

4-inch,	13	pounds per lineal foot.
5-inch,	17	pounds per lineal foot.
6-inch,	20	pounds per lineal foot.
7-inch,	27	pounds per lineal foot.
8-inch,	33½	pounds per lineal foot.
10-inch,	45	pounds per lineal foot.
12-inch,	54	pounds per lineal foot.

Sec. 15. All drain, soil, waste, vent and supply-pipes shall be as direct and concentrated as possible, protected from frost and readily accessible for inspection and convenience in repairing. When necessarily placed within partitions or in recesses in walls, soil and waste-pipes must never be covered except with woodwork, said woodwork to be so fastened with screws (never nails) as to be readily removed.

Sec. 16. Every vertical soil and main waste-pipe must be of cast or wrought iron, and when it receives the discharge of fixtures on two or more floors it must extend at least two feet above the highest part of the roof or coping, except in the case of flat-roof tenement-houses, in which case it shall extend at least six feet above the roof, and said pipe shall have a diameter above the roof at least one inch greater than that of the pipe proper; but in no case shall it be less than four inches in diameter above the roof. No cap or cowl shall be affixed to the top of such ventilation-pipe, but in tenement-houses a strong wire basket shall be provided and securely fastened thereto. Each length shall be securely fastened, and in the case of each line of soil-pipe it shall rest at its foot on a pier or foundation to prevent settling. All joints in cast-iron drain, soil or waste-pipes must be so filled with oakum and lead and hand-caulked as to make them gas-tight, and the amount of lead used shall be not less than twelve ounces to each inch diameter of the pipe so connected.

Sec. 17. Horizontal soil and waste-pipes are prohibited.

Sec. 18. There shall be no traps placed on vertical soil and waste-pipes.

Sec. 19. All changes in direction in cast or wrought-iron pipes shall be made with curved pipes, and all connections with Y branches and one-sixteenth or one-eighth bends, if possible.

Sec. 20. Soil, waste and vent-pipes in an extension must be extended above the roof of the main building, when otherwise they would open within twenty feet of the windows of the main-house, or the adjoining house.

Sec. 21. The least diameter of soil-pipe permitted is four inches. A vertical waste-pipe into which a line of kitchen sinks discharges must be at least three inches in diameter, if receiving the waste of five or more sinks, and shall have two-inch branches.

Sec. 22. Where lead pipe is used to connect fixtures with vertical soil or waste-pipes, or to connect traps with vertical vent-pipes, it must not be lighter than D pipe.

Sec. 23. All connections of lead with iron pipes must be made with a brass sleeve or ferrule of the same size as the lead pipe, put in the hub of the branch of the iron pipe and caulked with lead. The lead pipe must be attached to the ferrule by a wiped or overcast joint. All connections of lead waste and vent-pipes shall be made by means of wiped joints.

Sec. 24. Every water-closet, urinal, sink, basin, wash-tray, bath, and every tub or set of tubs and hydrant waste-pipe must be separately and effectively trapped, except where a sink and wash-tubs immediately adjoin each other, in which case the waste-pipe from the tubs may be connected with the inlet side of the sink-trap. In such a case the tub waste-pipe is not required to be separately trapped. Urinal platforms, if connected to drain-pipes, must also be properly trapped, and a supply of water so arranged as to always maintain the seal of said traps. In no case shall the waste from a bath-tub or other fixture be connected with a water-closet trap.

Sec. 25. Traps must be placed as near the fixtures as practicable, and in no case shall a trap be more than two feet from the fixture.

Each and every trap shall be ventilated either by a special vent-pipe of suitable size extending at least two feet above the highest part of the roof of the house (or into a special pipe erected for ventilating purposes only, in which case the area of the special vent must be increased as it passes upward so as to correspond to the combined area of all branch vents passing into it), or by some approved automatic vent. Approved mechanical traps may be substituted where it is necessary or advisable, but only on special permit from the Board of Health.

Sec. 26. The vent-pipe for each water-closet trap shall be at least two inches in diameter, and for traps under other fixtures not less than one and one-half inches. In all cases vertical vent pipes must be of cast or wrought iron.

Sec. 27. Vent-pipes must extend two feet above the highest part of

the roof or coping, the extension to be not less than four inches in diameter, to avoid obstruction from frost, except in cases where the use of smaller pipes is permitted by the Board of Health. These vent-pipes must always have a continuous slope, to avoid collecting water by condensation.

Sec. 28. No trap vent-pipe shall be used as a waste or soil-pipe.

Sec. 29. Overflow-pipes from fixtures must, in each case, be connected on the inlet side of the trap of the same fixture.

Sec. 30. No safe under any fixture shall be provided with any drip, waste or notice-pipe. The waste-pipe from refrigerators shall in no case be directly connected with any soil or waste-pipe, or with any drain or sewer, or discharge upon the ground.

Sec. 31. The sediment-pipe from kitchen boilers must be connected on the inlet side of the sink-trap.

Sec. 32. Water-closets must never be placed in an unventilated room or compartment. In every case the compartment must be open to the outer air, or be ventilated by means of a shaft or air-duct.

Sec. 33. All water-closets within the house must be supplied with water from separate tanks or cisterns, the water of which is used for no other purpose. A group of closets on the same floor may be supplied from one tank. Pan-closets and hollow plunger-closets are prohibited.

Sec. 34. Overflow-pipes from water-closet cisterns must discharge into an open sink, or where its discharge will attract attention and indicate that waste of water is occurring; but not into the bowl of a water-closet, nor directly into a soil or waste-pipe, nor into a drain or sewer.

Sec. 35. Water-closets, when placed in the yard, must be so arranged as to be conveniently and adequately flushed, and their water-supply pipes and traps must be protected from freezing. The compartment of such water-closets must be ventilated by means of slatted openings in the doors and roof.

Sec. 36. All waste, overflow or vent-pipes shall be of lead, cast or wrought iron.

Sec. 37. Rain-water leaders, when placed inside of any building, must be of cast iron, with leaded joints, wrought-iron screwed joints, or of copper, with soldered joints. When outside of the building and connected with the drain it must, if of sheet metal with slip joints, be trapped beneath the ground or just inside of the wall, the trap being

arranged so as to prevent freezing. In every case where a leader opens near a window or a light shaft, it must be properly trapped at its base. The joint between a cast-iron leader and the roof must be made gas and water-tight by means of a brass ferrule and lead or copper pipe, properly connected.

Sec. 38. Rain-water leaders must never be used as soil, waste or vent-pipes, nor shall any soil, waste or vent-pipe be used as a leader.

Sec. 39. No steam-exhaust, blow-off or drip-pipe from a steam-boiler shall connect with the sewer or with any drain, soil-pipe or waste-pipe. Such pipes must discharge into a tank or condenser from which a suitable outlet to the drain may be provided.

Sec. 40. Every new plumbing system, including those altered or extended, must be tested by the plumber by the air, water or pepper-mint test, in the presence of a proper officer of the Board of Health; all defective joints must be made tight and other openings made impervious to gases. Defective pipe must be removed and replaced by sound pipe.

Sec. 41. Cellar and foundation walls must be rendered impervious to dampness, and the use of asphaltum or coal-tar pitch in addition to hydraulic cement is recommended for that purpose.

Sec. 42. Cellars and areas should not be connected to the house-drain. Dry cesspools must be used to care for surface-water from cellars and areas, when practicable.

Sec. 43. Subsoil-drains must be provided when necessary, and in no case shall these drains have a direct connection with the sewer or the drainage system of any building.

Sec. 44. Yards and open light courts must always be properly graded, cemented, flagged, or well paved, and properly drained; when the drain is connected with the house drain it must be effectively trapped.

Sec. 45. Any person or persons or corporation offending against or violating any of the provisions of Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43 or 44 of this ordinance, shall, on conviction thereof, pay a penalty of fifty dollars for the first offense, and for the second and each subsequent offense the sum of one hundred dollars.

NOTE.—Each city or town can make its specifications in accord with these.

Copies of this circular can be had on application to E. M. HUNT, M.D., Secretary, Trenton, N. J.

For blank forms in execution of the law as used by the Asbury Park Board of Health, see pages 297-301 of this report.

CIRCULAR LXVII.

OF THE

NEW JERSEY STATE BOARD OF HEALTH.

**TO FUNERAL DIRECTORS AND ALL HAVING IN CHARGE THE CARE
AND BURIAL OF THE DEAD.**

Next to physicians there is no class of our citizens who in their official duties can be of more essential service in preventing the spread of disease and in helping to enlighten the people as to necessary precautions. For their own protection, as well as for that of others, they need to know the most effective measures to be adopted amid the surroundings of fatal disease. Their sanitary relation and jurisdiction include such cleansing, preservation and direction as to the dead body as shall make it least hazardous to the public health, and such dealing with the clothing, furniture and household where the death has occurred as shall prevent contagion or diminish that less specific pollution of air which also is unfavorable to health.

We notice some of the methods of management by which to insure protection :

After death, early attention must be given to any inward parts from which offensive discharges might escape. An egg-shaped plug should be carefully adjusted for this purpose. A small wad of cotton, tow, wool or oakum may be saturated with the copperas or chloride solution, or with tar, or the sticky portion of turpentine, and used for a plug. Better still, carbolized paper or cotton can now be had at small expense and used dry. This is suitable where we need to place an absorbent in the cavity of the mouth, or nose, or ears. A small rubber hand-syringe or spray atomizer easily washes out the most accessible cavities, such as the mouth and nostrils.

All garments that have been used next to the body, or that are in any way saturated or soiled, should be placed in very hot water—180° to 212°—or in some disinfecting solution without being taken from the room. Rags of any kind that have been used to receive the discharges from the mouth or nose or any part of the body should be burned. Other clothing should, in case of contagious diseases, be fumigated, or, in other cases, freely exposed to the air by being hung at the windows and afterward out-of-doors.

The body is best washed off with lukewarm water containing borax in the proportion of a teacupful to two quarts of water, and then should be sopped all over with some one of the solutions hereafter named as adapted for that purpose. After drying by means of towels some also prefer to anoint with vasaline. Dry powdered borax dusted over the surface, after washing and drying, is an excellent cleanser.

As the face and head are more especially exposed, these need the careful cleansing and washing, and use of absorbents heretofore referred to. Where the hair is long it is desirable that it be partly removed, but if this is objected to, it also can easily and safely be thoroughly washed with the zinc solution. The ancient head-dress or cap easily concealed any change of the hair and would still be in taste if fashionable. It is always necessary that very careful attention be paid to the proper cleansing of the hair; in case of any unusual odor or of any infectious disease the chlorinated soda or Labarraque's solution, or the chloride of zinc solution noted in the article on disinfectants, or a chlorine wash made by dissolving one-quarter of a pound of chloride of lime in a quart of water may be used instead or in addition. The National Board of Health directs the use of a saturated solution of the chloride of zinc as a wash, and the wrapping of the body in a sheet saturated with it. Sawdust well moistened with the chloride of zinc is also recommended to be placed in the coffin. Any sore or abrasion or wound should be cleansed when possible, and be freely covered with copperas wash, powdered charcoal, common salt, or any of the cleansing or drying articles above named.

A small bag of sawdust or fine shavings, or cotton or wool, interlaid with salt, borax or charcoal, may properly be closely pinned about the thighs. One good authority recommends that in some cases of delay or transportation, the body should be covered with sawdust, to which has been added tar or a pound of ivory black, or other crushed or powdered charcoal, so as to absorb any possible gases, or to pre-

vent escape of any fluid. Persons in attendance upon the sick or those laying them out do not increase their risks by such cleanliness. Indeed, those who during sickness, or in caring for bodies after decease, are familiar with methods of cleansing and disinfection are those who themselves escape, besides protecting society.

For purposes of washing we prefer the chloride of zinc solution (butter of zinc in the proportion of 10 per cent. or about three ounces to a quart of water). It is a good disinfectant without odor, and there is no risk of any discoloration therefrom. The fifty-per-cent. solution of Squibb, which costs about twenty-five cents per pound, is convenient. The chloride of lime in solution is recommended by a committee of the A. P. H. Association in the proportion of one ounce and a half to a quart of water. A solution of chlorinated soda, similar to Labarraque's solution, is also now in the market (Squibb's), and may be used diluted with nine parts of water. Those accustomed to it may use instead a colored solution of corrosive sublimate 1 to 1,000 parts.

Where the disease is highly infectious it is usual afterward to wrap the body in a sheet which has been saturated with the chloride of lime or chloride of zinc, or corrosive sublimate solution of double the strength named above.

Solutions of corrosive sublimate should not be placed in metal receptacles, and all disinfectant solutions which are not colored or have no smell should be carefully marked so as to distinguish them from drinking-water.

CLOTHING.

For rendering the clothing safe, the committee before referred to gives preference to a solution of corrosive sublimate and sulphate of copper in the proportion of four ounces of corrosive sublimate and one pound of sulphate of copper (blue vitriol) in a gallon of water.

Any of the following will also be found available: Chloride of lime, 4 ounces to a quart of water; or chloride of zinc, 4 ounces to a quart; or sulphate of zinc (white vitriol), 4 ounces to a quart; or sulphate of iron, one-half pound to a quart. The articles to be disinfected must be well soaked in the disinfecting solution and left in for at least two hours, after which they may be wrung out and sent to wash. Yet, if articles such as admit of boiling in hot water for half an hour are placed into it before removal from the room, and kept boiling, they need no other disinfection.

Clothing or bedding which cannot be washed or subjected to steam can be disinfected by exposure to heat in such forms of apparatus as are now in use in many cities. Where this arrangement cannot be had, and for houses or rooms that need disinfecting, fumigation with sulphurous acid gas is the most reliable. The articles also needing to be disinfected should be unfolded and hung about the room.

To disinfect a room or building so needing disinfection that its contents and surfaces cannot be easily dealt with singly, close the room or building, its windows, doors and chimneys, so as to exclude the outer air as far as possible. Vacate the house. Break roll sulphur in small pieces, place it on an iron plate or other metallic dish and set this on a pair of tongs, or other cross-bar, over an iron pot in which there is water, or over a large box of sand, so as to avoid danger of fire from small particles of burning sulphur. Light it with a few hot coals, or some alcohol poured around the sulphur and lighted. Then leave and shut the door after you. One pound and a half of sulphur is sufficient for 1,000 cubic feet of space. Keep the room closed three hours after the burning has ceased, then flush it well with air for three hours before occupancy. Clothing and bedding needing disinfecting may be hung on lines and left in the room. Most furniture is not injured, but needs dry wiping and washing afterward.

Soiled mattresses, pillows, feather beds and articles of this nature cannot be effectually disinfected by sulphur fumigation, owing to the fact that the gas does not penetrate to their interior in sufficient amount. For articles of this kind and in general for articles of little value, destruction by fire will be advisable, but there must not be exposure of other persons in conveying them to a fire. The need for the destruction of beds will depend upon the disease, the degree they have been soiled, and the thoroughness of disinfection and fumigation that can be secured.

PRESERVATION AND TRANSPORTATION OF BODIES.

In addition to this outside disinfection of the body and its surroundings, means are sometimes used for preservation of the body. Where fluids are drawn off they need to be received into vessels containing disinfecting solutions. Where puncture is made for the purpose of liberating gases a large sponge or cloths soaked with strong disinfectants placed over the mouth of the tube used will receive and

disinfect the particles and much of the gaseous matter. The injection of disinfectants into the veins or arteries or into cavities is now practiced by many undertakers, and aids much in preservation.

If the care we have directed as to the body were always exercised, we should have but little of the danger of contracting disease from dead bodies at funerals. Coffins should not be tightly closed for some time and then opened for view. Thus any foul gases are concentrated. The body will thus keep longer if there has been complete exclusion of air, but this is seldom secured. Even then the opening should occur where there will not at once be exposure.

The undertaker needs not only practice, but a technic knowledge of his art. The spray forms of syringes, trocar, sponges, carbolized paper and cotton, bandages, wadding, two or three of the most approved disinfectants, all put up in a case of convenient form, belong as much to his art as does the medical case to the physician.

The last ten years have developed possibilities of care for the dead wholly new and greatly valuable. We believe the time not distant when the occupation will be followed as an exact sanitary art, and become a great adjunct in the checking of contagious diseases. The art of preservation and disinfection is now so complete that if only the undertaker knows the details of proper cleansing and dressing, and keeps himself supplied with the proper appliances of his art, he will not only add to his own skill, but make himself a worthy and effective custodian of the public health.

It is greatly important, also, that the care of the undertaker should extend to the surroundings of the fatal sickness.

He should learn how the rooms may be made least likely to convey disease or to deteriorate the air. We have many times attended at funerals where both the coffin and the room that contained it have been closed for some time before. The stifled air thus charged with particles of decay, even in cases of non-malignant disease, has occasioned faintness and discomfort which might have been avoided by a flushing of fresh air and removal of close curtains.

The undertaker should be familiar with the use and value of circulating air, cleanliness and disinfectants, both for the house and the premises, and often more than any one else just at this time is in a position to give advice and direction which will be heeded and obeyed.

Copies of this and other circulars can be had by addressing by postal, E. M. HUNT, M.D., Secretary, Trenton, N. J.

MEDICAL REGISTRY.

The law makes it the duty of every person settling in this State for the practice of medicine and surgery to file a copy of his diploma, or in case of twenty years' practice in any one locality in this State, a certificate thereof, in the office of the County Clerk. The diploma is not merely any writing or certificate which may be given, but must be from a chartered medical college. The law is founded upon the right of the public to know that those who claim capacity for the treatment of disease should be able to show some evidence thereof. The State really owes it to itself somehow to protect its citizens more fully from the imperfect knowledge and lack of skill of many who, although graduated from inferior institutions, are not fitted for their work. Since the law at present reaches only to the requirement of registry, this must be fully complied with and proper examination made of diplomas presented. The following are the lists furnished by County Clerks for the past year.

ATLANTIC COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA AND ITS LOCALITY.
Crowell, Godfrey M.....	Hammonton.....	Mar. 30, '82	Jefferson College, Phila.
Dougherty, John.....	Atlantic City.....	Apr. 2, '85	Jefferson College, Phila.
Hodges, W. M.....	Hammonton.....	Mar. 1, '69	Columbia College, New York.
Ingram, Nelson.....	Atlantic City.....	Mar. 1, '66	Bellevue Hos. Med Col. N Y.
Pryor, James E.....	Atlantic City.....	Mar. 21, '88	Detroit Col. of Med., Mich.
Rathbun, Greenville A...	Atlantic City.....	Apr. —, '88	Homeopathic College, N. Y.
Siggins, John J.....	Atlantic City.....	Apr. 2, '85	Mich. Col. of Med., Detroit.
Webster, J. Bart.....	Atlantic City.....	Apr. —, '87	Philadelphia Med College.

BERGEN COUNTY.

Archer, William.....	Rutherford.....	Feb. —, —	Eclectic College, New York.
Archer, Hannah E.....	Rutherford.....	Feb. —, —	Eclectic College, New York.
Hamilton, Ezra W.....	Oakland	Mar. 3, '81	Homeopathic College, N Y.
Lambertson, George V...	Lyndhurst.....	May 15, '57	Botanic Phy. and Sur., N. Y.
Morris, Patrick H	Englewood .....	.....	Affidavit—20 years' practice.
Vroom, William L.....	Ridgewood	Mar. 6, '88	University of New York.
Ver Nooy, Charles.....	Rutherford.....	Apr. —, '88	Homeopathic College. N. Y.
White, Frank H.....	Hackensack.....	July —, '72	University of New York.

BURLINGTON COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA AND ITS LOCALITY.
Brainin, John W.....	Mount Holly	Apr. 25, '88	Hahneman College, Phila.
Bayley, Weston D.....	Burlington	Apr. 6, '88	Hahneman College, Phila.
Gauntt, F. Allen.....	Burlington	Apr. 2, '86	Jefferson College, Phila.
Goldsmith, Charles A.....	Bordentown	— 3, '79	University of Massachusetts.
Harris, William H.....	.....	Oct. 13, '88	.....
Ingram, T. E.....	Burlington	Apr. 2, '88	Jefferson College, Phila.
Kille, Chalkley J.....	Moorestown	Mar. 25, '78	University of Pennsylvania.
Siggins, John J.....	Mount Holly.....	Mar. 2, '86	Michigan College of Med.
Heinekin, Theodore S....	Florence.....	Feb. 24, '88	Philadelphia College of D.

CAMDEN COUNTY.

Damon, S. J.....	Camden	Dec. 1, '78	Amer. Health Col., Cin., O.
Greene, J. A.....	.....	Sep. —, '86	Eclectic Medical College.
Marston, A. J.....	.....	May 9, '78	Eclectic Medical College.
Hylton, J. Dunbar.....	Palmyra.....	Mar. 14, '86	University of Pennsylvania.
Gibbs, Godfrey.....	.....	Mar. —, '84	Jefferson Medical College.
Fortiner, Byron E.....	.....	Mar. 1, '88	Penna. Col. of Den. Surgery.
Soper, Augustus .....	.....	May 20, '88	Col. Phys. and Sur., Ontario.
Soper, Lyman W.....	.....	May 22, '88	Eclectic, Cincinnati, Ohio.
Delap, W. L.....	Gloucester City....	Mar. 31, '86	Hahneman Medical College.
Adamsen, Hans.....	.....	Apr. 4, '88	Jefferson Medical College.
Lewis, Benjamin Sykes...	.....	Apr. 4, '88	Jefferson Medical College.
Hill, E. Hart.....	.....	Apr. 6, '88	Hahneman Medical College.
Miller, Edwin H.....	.....	May 1, '88	University of Pennsylvania.
Macfarland, B. W.....	.....	Apr. 4, '88	Jefferson Medical College.
Lane, J. Lewis.....	.....	Apr. 4, '88	Jefferson Medical College.
Sharp, Lewis L.....	.....	Apr. 6, '88	{ Hahneman Medical Col- lege and Phila. Hosp
King, Joseph H.....	.....	June 25, '67	Eclectic Med. Col., Phila.
Pursell, John C.....	.....	— —, '82	Jefferson Med. Col., Phila.
Lambach, Frederick, Jr...	.....	May 2, '87	University of Pennsylvania.
Smith, Samuel Byran....	.....	Apr. 6, '88	Hahneman Med. Col., Phila.
Hinde, W. Hugh.....	.....	May 22, '78	American Health College.
Murray, J. M.....	.....	Mar. 10, '76	U. P. A. (621 N. Second St.)
Baer, J. S.....	.....	Apr. 4, '88	Jefferson Medical College.
Hume, Charles.....	.....	Mar. 4, '82	Missouri Medical College.
Jennings, W. B.....	.....	Apr. 4, '88	Jefferson Medical College.
Work, R. A.....	.....	Nov. 27, '81	American Health College.
Tucker, Edward J.....	.....	Mar. 6, '85	University of New York.
Bean, F. A.....	.....	— —, '55	Met. Med. Col., N. Y. City.
Braymer, Orange W.....	.....	Apr. 4, '88	Jefferson Medical College.
McGill, Edw. E.....	.....	Mar. 10, '80	Hahneman Medical College.
Flower, R. C.....	.....	Mar. —, '81	Amer. Health Col., Cin., O.
Barnart, Newton H.....	.....	Apr. 6, '88	Hahneman Medical College.
Emrick, M. Luther.....	.....	Apr. 4, '88	Jefferson Medical College.
Wright, A.....	Berlin.....	Mar. 6, '74	Hahneman Medical College.

CAPE MAY COUNTY.

Leach, Alonzo L.....	Cape May City....	Mar. 17, '88	Jefferson College, Phila.
Pryor, James E.....	Ocean City.....	Mar. 20, '88	Detroit Col. of Med., Mich.

CUMBERLAND COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA AND ITS LOCALITY.
Demon, James S.....	Camden	Dec. 1, '76	Am. Health Col., Cincinnati.
Gladwin, Daniel W.....	Camden	Apr. 16, '86	Am. Health Col., Cincinnati.
King, Joseph Henry.....	Bridgeton	June 25, '67	Collegium Electricum, Pa.
Oliver, David H.....	Bridgeton	Apr. 4, '88	Jefferson College, Phila.
Siggins, John J.....	Bridgeton	May 21, '88	Mich. Col. of Med., Detroit.
Sharp, Ezra B.....	Port Norris.....	Apr. 17, '88	Acad. Tenar Mariae, Balto.
Thompson, John R. C....	Bridgeton	Apr. 4, '88	Jefferson College, Phila.
Tomlinson, Joseph.....	.....	Mar. 1, '78	Columbia College.

ESSEX COUNTY.

Ansanelli, Vincenzo .....	.....	Aug. 20, '73	University of Naples, Italy.
Ardrey, Sarah A.....	.....	May 24, '88	{ Med. Elect. Certif., signed by Dr. Jane H. Murphy.
Braun, Joseph.....	.....	Feb. 27, '83	Roy. Bavar'n Univ., Munich.
Becker, F. W... ..	.....	May 10, '88	Col. of Phys. and Surg., N. Y.
Christian, Albion C.....	.....	Mar. 9, '87	{ West. Reserve Univ. Med. Dept., Cleveland, O.
Dolphin, Michael O'F.....	.....	Dec. 22, '82	Royal Col. of Surg., Ireland.
Diltze, Carolina.....	.....	Aug. 4, '84	Columbia Col. of Midwifery.
Frey, Albert.....	.....	May 10, '88	Col. of Phys. and Surg., N. Y.
Groves, Charles A.....	.....	Mar. 3, '81	Homeopathic College, N. Y.
Gorska, Eleanora.....	.....	Apr. 16, '87	Univer. of Posen, Germany.
Goodell, James F.....	.....	Mar. 12, '79	N. Y. Homeopathic College.
Harrison, Lucia W .....	.....	Feb. 3, '74	Women's Med. College, N. Y.
Hinton, Antoinette W....	.....	May 29, '85	College for Females, N. Y.
Harman, G. W.....	.....	.....	.....
Hampson, Clara Susan...	.....	Apr. 1, '88	Electric Med. College, N. Y.
Hopkins, James D.....	.....	Feb. 28, '73	N. Y. Col. of Vet. Surgeons.
Ill, Charles L.....	.....	Mar. 12, '88	Bellevue Hosp. Med. College.
Krause, Henry G.....	.....	Apr. 15, '79	Univ. of Strausburg, Germ'y.
Lehlbach, Charles.....	.....	May 10, '88	Col. of Phys. and Surg., N. Y.
Lueschow, Mary.....	.....	Aug. 30, '88	Columbia Col. of Midwifery.
Martin, Peter.....	.....	.....	Affidavit of service.
Morrison, Alexander .....	.....	Nov. 17, '87	Glasgow Univer., Scotland.
Mandeville, Charles D....	.....	Nov. 22, '87	Dartmouth College, N. H.
Mandeville, Frederick A.	.....	Apr. 8, '88	Homeopathic Med. College.
Matthews, H. E.....	.....	May 10, '88	Col. of Phys. and Surg., N. Y.
Nash, Albert Burr.....	.....	May 12, '87	Columbia Col. of Ph and Sur.
Potter, George E.....	.....	Jan. 1, '84	Eclectic Med. Col., Cincinnati.
Raffaele, Asselta .....	.....	Feb. 8, '84	University of Naples, Italy.
Rescunti, Antonio.....	.....	Aug. 8, '87	University of Naples, Italy.
Richards, G. Herbert.....	.....	Apr. 15, '85	N. Y. Homeopathic College.
Seidmann, Marco.....	.....	May 6, '86	Ludovicia College, Bavaria.
Sutton, Edward .....	.....	May 10, '88	Col. of Phys. and Surg., N. Y.
Simmons, M. Herbert....	.....	Mar. 2, '80	Albany Medical College.
Vaughan, Horace.....	.....	Apr. 4, '88	Jefferson Med. Col., Phila.
Wendel, Augustus V.....	.....	Mar. 15, '88	Col. of Phys. and Surg., Md.
Wallhauser, Henry J. F..	.....	Mar. 6, '88	University of City of N. Y.
Woodruff, Frank Crane...	.....	Apr. 14, '87	Homeopathic College, N. Y.

GLOUCESTER COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA AND ITS LOCALITY.
Ashcraft, Samuel Fiser...	Mullica Hill.....	Apr. 4, '88	Jefferson Med. Col., Phila.
Burchell, John Gale. ....	.....	Apr. 27, '65	Eclectic Med. Col., Phila.

HUDSON COUNTY.

Bogardus, Henry J.....	.....	July 11, '88	University of New York.
Bull, Edward L.....	.....	May 10, '88	Col. of Phys. and Surg., N. Y.
Dolphin, Michael O'F....	.....	Dec. 22, '82	Royal Col. of Surg., Ireland.
Drayton, Henry S.....	.....	Mar. 1, '87	Eclectic Med. College, N. Y.
De Long, Arthur D.....	.....	Mar. 9, '88	University of New York.
Ennis, Thomas.....	.....	Jan. 15, '88	Victoria Med. Col., Quebec.
Grew, Francis B.....	.....	Apr. 16, '75	Roy. Col. Surg., Edinburgh.
Humphrey, Cornell L....	.....	Jan. 24, '65	Geneva Med. College, N. Y.
Henning, Richard.....	.....	Dec. 19, '88	Affidavit—20 years' practice.
Kuehne, Richard.....	.....	May 10, '88	Col. of Phys. and Surg., N. Y.
Lewis, William C., Jr....	.....	Mar. 10, '80	University of Pennsylvania.
MacRae, Thomas D.....	.....	Mar. —, '84	University of New York.
Myers, Euphemia J.....	.....	Apr. 3, '88	Women's Med. College, N. Y.
Nabers, A. J.....	.....	July —, '84	Kentucky Medical Academy.
Nevin, William R.....	.....	May 18, '87	Homeopathic Med. Col., N. Y.
Schumann, Carl.....	.....	May 18, '87	Homeopathic Med. Col., N. Y.
Stanwood, Robert G.....	.....	July 5, '78	Bowdoin College, Med. Dept.
Shain, Francis W.....	.....	Mar. 13, '87	Jefferson Med. Col., Phila.
Small, Edwin.....	.....	Mar. —, '85	Col. of Phys. and Surg., Md.
Towle, Henry A.....	.....	Nov. 1, '87	Col. of Phys. and Surg., N. Y.
Williams, Thomas D.....	.....	May 1, '85	University of Pennsylvania.

HUNTERDON COUNTY.

Archer, William.....	Clinton	Feb. 4, '69	Eclectic Med. College, N. Y.
Archer, Hannah E.....	Clinton.....	Feb. 4, '69	Eclectic Med. College, N. Y.
Dunning, William Barry.	Lebanon	Mar. 1, '71	N. Y. Col. of Phys. and Surg.
Follets, William Mann...	New Brunswick...	Mar. 1, '83	Eclectic Med. College, N. Y.
Nash, A. B.....	Frenchtown	Mar. 10, '76	University of Pennsylvania.
Seip, George W.....	Reading, Pa.....	Mar. 8, '62	Jefferson Med. Col., Phila.

MERCER COUNTY.

Fowler, Richard C.....	Trenton.....	.....	Am. Health Col., Cincinnati.
Sinne, Hans H.	Trenton.....	Apr. 5, '87	Jefferson Med. Col., Phila.
Murray, James Munro...	Pennsylvania	Mar. 10, '76	University of Pennsylvania.
Damon, S. James.....	.....	Dec. 1, '76	Am. Health Col., Cincinnati.
Gulick, Arnatt Reading..	Trenton.....	Mar. 12, '88	Bellevue Hosp. Med. College.
Kline, Andrew K.....	Somerville	Apr. 13, '88	N. Y. Homeopathic Med. Col.
Wells, Joseph M.....	.....	.....	Jefferson Med. Col., Phila.

MIDDLESEX COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA AND ITS LOCALITY.
Beekman, Jesse H.....	Sayreville.....	— —, '88	Hahneman Medical College.
Donahue, Lawrence A...	Perth Amboy.....	Mar. 1, '84	University of New York.
Follett, Henry A.....	.....	— —, '87	Georgia Medical College.
Kearsey, William P.....	Perth Amboy.....	Mar. —, '88	College of Phys. and Surg.
Lang, Maria A. S. ....	.....	— —, '87	College of Midwifery.
Ramsey, William E.....	Perth Amboy.....	May 10, '88	College of Phys. and Surg.
Siggins, John J.....	.....	Apr. 2, '86	Michigan Medical College.

MONMOUTH COUNTY.

Baker, George Fales.....	.....	Mar. 2, '70	University of Pennsylvania.
Bell, James H.....	.....	Mar. 25, '84	Jefferson Med. Col., Phila.
Clarke, J. C. ....	.....	Apr. 8, '88	Hahneman Med. Col., Phila.
Dunbar, Thomas, Jr.....	.....	Apr. 4, '88	Jefferson Med. Col., Phila.
Gage, Mary Emmerson...	.....	Apr. 20, '86	Medical Academy of N. Y.
Hopkins, Richard S.....	.....	May 1, '88	Dental Dept Univ of Penna.
Hinman, Richard E.....	.....	Apr. 1, '88	N. Y. Homeopathic College.
Jones, Dixon. ....	.....	May 15, '83	Columbia College
Laney, John C.....	.....	Apr. 2, '83	Jefferson Med. Col., Phila.
MacMillan, William T...	.....	Mar. 10, '88	Baltimore Medical College.
Meyer, Alfred.....	.....	Mar. 10, '87	Col of Phys. and Surg., N. Y.
Negley, Henry A.....	.....	May 10, '88	Columbia College.
Reed, Jacob J.....	.....	May 2, '88	Columbia College.
Tindall, D. M.....	.....	Mar. 2, '41	Pennsylvania Med. College.
Whitmore, Walter S.....	.....	Mar. 7, '87	University of New York.

MORRIS COUNTY.

Bradford, F. Standish.....	.....	Mar. 9, '88	Jefferson Med. Col., Phila.
Bell, Jacob F.....	.....	Mar. 13, '83	University of New York.
Cook, Richard L.....	.....	Mar. 15, '86	Col. of Phys. and Surg., Md.
Coates, George C.....	.....	Mar. 8, '88	University of New York.
Gorton, Eliot.....	.....	Mar. 9, '88	Long Island College Hosp.
Harris, H. C.....	.....	Apr. 23, '83	University of Pennsylvania.
Kice, Henry William.....	.....	Mar. 6, '88	University of New York.
Mial, L. L.....	.....	May 2, '87	University of Pennsylvania.
Rogerson, Robert.....	.....	Sept. 20, '59	Faculty of P. and S., Glasgow.
Risk, J. Boyd.....	.....	Mar. 14, '79	University of Pennsylvania.
Spratling, W. P.....	.....	Mar. 13, '86	Phys. and Surg., Baltimore.

OCEAN COUNTY.

Care, Henry Hamilton..	Lakewood.....	Apr. 8, '84	Hahneman Med. Col., Phila.
Adler, Lewis H., Jr.....	.....	May 1, '84	University of Pennsylvania.
MacMullan, William T....	New Egypt.....	Mar. 22, '88	Col of Phys. and Surg., Md.

PASSAIC COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA AND ITS LOCALITY.
Alderton, Henry A.....	.....	Sept. —, '84	Columbia College, N. Y.
Agnew, Francis E.....	Paterson	May 12, '85	{ College of Phys. and Surg. Columbia College, N. Y.
Atkinson, James W.....	Paterson	June 2, '86	Long Island Hosp. College.
Born, Renben Hill.....	Paterson .....	.....	Bellevue Hosp. Med. College.
Berdan, Edith (for. Hale)	Paterson	Mar. 1, '83	Univer. of Ohio, Cincinnati.
Balcom, Lafayette.....	Paterson	Feb. 23, '64	Buffalo University.
Crooks, James, Jr.....	Paterson	May 18, '87	N. Y. Homeopathic Med. Col.
Cunningham, William P.	Passaic Bridge....	Mar. 14, '87	Bellevue Hosp. Med. College.
De Uling, Ernestus B....	Paterson	Sept. 10, '62	University of Vienna.
Gillson, John Thomas....	Paterson	Mar. 12, '88	Bellevue Hosp. Med. College.
Hopper, C. Percy.....	Paterson	Mar. 15, '83	Homeopathic College of N. Y.
Harrison, J. Charles.....	Newark.....	Mar. —, '83	Electric Med. Col., Chicago.
Kearns, Robert.....	Paterson	May 10, '88	Columbia Col. Phy. and Sur.
McEncroe, J. F.....	.....	May 12, '87	Columbia Col. Phy. and Sur.
Norris, Ida Florence.....	Paterson	Apr. 20, '86	N. Y. Med. Col. for Women.
Palmer, George M.....	Paterson	Mar. 4, '80	Electric Med. College, N. Y.
Paton, Thomas Lloyd....	Paterson	Mar. 25, '87	Md. Col. of Phys. and Surg.
Tuller, Malcolm B.....	Mar. 10, '73	Hahneman Med. Col., Phila.

SALEM COUNTY.

Siggins, John J.....	Apr. 2, '85	Mich. College of Medicine.
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SOMERSET COUNTY.

Sutphen, Fred. Cornell...	Liberty Corner.....	June 18, '88	University of City of N. Y.
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SUSSEX COUNTY.

Croskery, Robert.....	Ogdensburg	Jan. 2, '67	Edinburgh Roy. Col. of Phys.
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UNION COUNTY.

Gibb, W. Travis	Plainfield	Mar. 6, '86	University of City of N. Y.
Jones, Herbert Samuel...	Elizabeth	Apr. 13, '88	N. Y. Hom. Col. and Hosp.
Perry, Charles F.....	Elizabeth	May 1, '88	University of Pennsylvania.
Rupp, Philip.....	Plainfield	May 12, '87	Columbia College, N. Y.
Siggins, John J.....	Elizabeth	Apr. 2, '85	College of Medicine, Detroit.
Westfall, E. James.....	Rahway	— —, '71	Columbia College, N. Y.

WARREN COUNTY.

Anderson, George R.....	.....	.....	University of Pennsylvania.
Cavanaugh, James J., Jr.	Belvidere	— —, '84	Bellevue Hosp. Med. College.
Jacoby, Aaron P.....	Phillipsburg	— —, '87	Jefferson Med. Col., Phila.
Rowell, S. N.....	Vienna.....	— —, '62	Yale College.

REPORT
OF THE
BUREAU OF VITAL STATISTICS
OF THE
STATE OF NEW JERSEY

FOR THE
Statistical Year from July 1st, 1887. to July 1st, 1888.

WITH CLIMATOLOGY, DECENNIAL TABLES, ETC.

— — —
By EZRA M. HUNT, M.D., D.Sc.,

Secretary and Medical Superintendent of Vital Statistics.

REPORT ON VITAL STATISTICS

BY THE MEDICAL SUPERINTENDENT OF VITAL STATISTICS.

INTRODUCTION.

The present report completes the first decade of registration of vital statistics under the present system. It would have been in some respects more convenient, and much better for comparison with other States, if our statistical year, which begins July 1st, could have begun with the civil year; but inasmuch as our system went into operation in the middle of the year and report must be made to the Legislature in January of each year, it was not regarded as satisfactory to have the report fall over a year behind. The State and this Bureau are under the greatest obligations to the Hon. Henry C. Kelsey for his recognition of the relation of these statistics to health administration, and for his co-operation with us in the co-ordinate relations which his department bore to these records. As the books of record necessarily came to be in the health department, and even for all searches and references recourse must be had also to this office, it was his judgment and advice that the entire charge of this Bureau should be transferred to the State Board of Health. Accordingly, by an act of the last Legislature, the Bureau of Vital Statistics is under the full charge of the State Board of Health. Besides the indispensable value which these statistics have in the study of all questions relating to health and population, we are also authorized to give such certificates as may be necessary in questions of age, residence, pension, to prove the dates of the several events, or for any other purposes in which legal questions may be involved. The marriage, birth and death returns for the State have now, for ten years, been so collected and arranged as to be readily accessible for all purposes of legal inquiry, for all needs relative to social and economic questions, and for study in their intimate relations to a care of the public health. While each year shows

a gain in accuracy of returns, it also brings to view some defects and urges us to efforts for increasing accuracy. While knowing the approximate value of the figures of each yearly report, we have never failed to present the fact that accurate conclusions as to the death-rate, the marriage-rate or the birth-rate of any locality cannot be based upon the figures of any single year. It is equally true that we need to deal with larger aggregates of population than are afforded even by populous cities. It is for this reason that we attached so much importance to the quinquennial report made in 1883, and now attach still more importance to the two quinquennial, or combined decennial report which we are able to make this year. It will be the chief object of this report, in addition to the usual annual report of vital returns, to present these figures in a way in which they may be studied and compared. We are aware of the very many other combinations which could be made, and which are deemed important by the highest statistical authorities. The material for these combinations will be found fully on record in the office. Within the scope of our appropriation, we use those which are really the most informatory and valuable, and thus help to guide physicians, health officers, sanitarians and statisticians in the study of those vital questions bearing on the health and vitality of population. We believe the time is coming when each individual will be studied as related to the resources and prosperity of the State, even as to his individual health. No other question so much involves our industrial prosperity as that of the health capacity of the individual and the tenure of his life. It not only determines the number of the producing classes, but that equally important question of how large shall be the number of the dependent classes. And it is to be remembered that these latter not only cannot contribute to the general stock of human industry, but become a tax upon resources which otherwise would be available in more profitable directions.

Even these beginnings of an orderly study of population in its most vital events helps to direct public and expert attention to the importance of the care of the people, and especially of such provisions as shall protect them from those destructive influences to which these statistics show them to be exposed. For it is only by such knowledge, as a part of political economy and resulting in legislative enactment, that the welfare of the people can be conserved. While knowledge of the laws of personal health may do much for us, Dr. Russell, the Health Officer of Glasgow, has well said that "nothing is more

conspicuous than the helplessness of the individual, under the conditions of civilized life, to secure the physical basis of health."

He is comparatively helpless against impure water, imperfect foods, contaminated air and against the invasion of insidious endemics and epidemics, unless his government informs itself as to the facts, as to causes, gets at the ages and circumstances of the material exposed and then collects such statistical data as admit of accurate comparison. Thus it is that we here collect information for the study of disease in its varieties, localities and modes of invasion. Of the study also of other vital relations of populations that bear on all social and life conditions and add our quota to aid in securing a prolongation of life, a mitigation of disease and that prosperity and happiness so dependent upon human health.

PERILS OF POPULATION.

**RECORDS OF THE CONDITIONS AND PERILS—HOW THEY ARE TO
BE STUDIED, AND THEIR USE AS PRACTICAL GUIDES
TO THE PREVENTION OF DISEASES.**

Vital statistics furnish one of the accounts which the State keeps of its population.

The very word "statistics," as first used by Prof. Achenwall, of Göttingen (1749), had reference to inquiries into the resources of a government, of which the people are the first and the greatest element. Eliot, the statistician, in his definition of statistics, puts first and foremost "facts relating to population, deaths, births and marriages; health, disease and duration of life." Even as early as 1660, Conring, professor of medicine and politics in the University of Helmstad, had discussed facts or records as to their bearing on public health and happiness. The London Statistical Society (1835) was not slow in seeing the importance of vital statistics, and no doubt led the way for the English law of 1837. As the people are a material resource, vital statistics have the same relations to the State as have any other statistics which are gathered for the purpose of indicating lines of progress or decrease.

In another aspect they are the legal record which is needed to guide as to various questions of age, marriage, pension, military service, citizenship, &c. Either of these would not only justify but require that such records be kept and studied as to their social and legal bearings. These also have some incidental significance for comparisons, as we shall hereafter see. It was not until much later that it came to be recognized that not only must vital statistics be studied in their effect upon population as bearing upon progress and upon social conditions, but that for medical and health purposes, and in order to know the causes and courses of vitality, we must deal with this class of statistics in still another direction. In other words, the physician

must also have access to numerical records if he desire to subject his art to the test of results on the one hand, or if as a science he desires to be guided to causes on the other. Still more the practitioner of the health-preserving and sickness-preventing art must thus obtain some of the foundation-stones on which any upbuilding of the science and art of sanitation must rest.

It would somewhat have aided in perspicuity if the three designs could have been kept totally distinct. Then, while each one engaged in the collection of the facts within his own sphere of inquiry would have known what the collection was being made for, the student of statistics in relation to diseases and their prevention would have been equally able, borrowing the little he needed from the others, to study the combined results. But as it is not practicable to collect the items for the three objects separately at different times, and with different officers, all are collected together. To many this is a source of confusion, since the lawyer scarcely sees why it is of much consequence what a person has died of, so long as he has died without violence, and that there is legal record of his death. The student of sociology cares chiefly for age and occupation, and the period of working activity in its influence on the development of industries and the progress of the State, while the physician regards the marriage and the birth as not very important as medical facts, and looks upon diagnosis and statement of the disease and its result as the only points bearing either on the science of medicine or demography, or of hygiology.

It cannot be expected that any one of us should be able to investigate the reasons for methods and details in any given inquiry unless we have full time therefor. It is, therefore, a great satisfaction to be able quietly to rely on competent testimony or assertion as to what is necessary to be done in order to carry out the design of any given science or art, and to accept the axioms to which such subscribe rather than depend upon what must be, to those busy in other directions, a mere superficial study.

Happily for us, there are many settled convictions of those who have achieved success in this line which we may accept, and from which we may work forward and onward without fear that the foundations are not firm. The whole system, so far as sanitary science is concerned, grew out of mathematical and not out of experimental methods.

Dr. H. I. Bowditch, of Boston, not less distinguished as a medical

than as a sanitary practitioner, spoke of the second great epoch in medical science as related to hygiene as beginning about 1832 and closing about 1869. He calls it the epoch of the accurate recording of facts and subsequent analysis of them, and regards them as revealing the tendency of most diseases to recover without active medication if any of the resources of nature are made available. So he takes this epoch as the introduction to the preventive art. Louis, in France, and Gerhard and Jackson, in this country, became the pioneers in what has ever since been called the numerical method of studying disease, and in what the sanitary art calls the numerical method of studying the prevention of disease. It is based on such close observation as leads to medical book-keeping, such as is furnished either by the record of each day's facts as to a given disease, some of them numerical, some of them graphic or by lines and charts, and some of them described by words. In each of them precision and record is the idea, all the more significant and important because the effort at precision will no doubt reveal some discrepancies and some misleading facts or figures. If so, two results follow—the one, an effort at greater accuracy, and the other an acquired tact or expertness in dealing with the inaccuracies, so that with them we shall have accurate methods for making allowance for them, and for canceling them in the equation so that they shall not be disturbing quantities, or only to an appreciable extent. The statistician also by this method acquires tact and accuracy in dealing with truths as well as in eliminating errors. Vital statistics very early had the advantage of commanding the services of men who were competent, scientific and mathematical witnesses to the feasibility of numerical methods, as also of those who did much to furnish plans for detecting errors and arriving at accurate formulas for estimating the disturbances caused.

Halley, the inventor of life tables, had tested his astronomical calculations by their verification, and “believed in the constancy of the laws of nature, and ventured, from a knowledge of a part of a course of a comet, to predict” when it would return, as it did after his death. He also conceived the possibility of defining the course and conduct and studying the variations of human life, and so brought the science of numbers to bear on health, disease and longevity. It was not until after the most accurate study of methods and results that Beneké, the great German statistician, said that “mortality statistics are the basis of public as well as private care of health ;” or

Farr, of England, that "deaths and causes of deaths are scientific facts, which admit of numerical analysis;" or the American statist, De Bow, that "the experience of all countries preserving such records shows a marked amelioration of society, diminution of disease and extension of the average period of human life."

When we add the testimony of such statisticians and scientists as Parent-Duchatelet, Bertillon, Quetelet, Snow, Baker, Billings, and many others who have made close and accurate studies of systems and variations, and when their views have been accorded in by the leaders of sanitary science, who have availed themselves of results and predicated successful administration thereupon, we need not be in any doubt as to the feasibility of such collections, as to the significance of such records, or as to the progress in their study which is sure to be made.

We must, therefore, be pardoned for not attempting further in this paper to allude to their necessity, but spend the space we have in indicating what use should be made of those already collected, what deductions can be drawn therefrom, what false deductions are attempted and should be avoided, and what defects either in collection or combination should be corrected.

While in doing this I shall no doubt weaken the force of statistics to those who are by constitution or education of a skeptical turn of mind, and afford them objections which will weigh on their own minds, I shall at least show that my duties have led me to no blinded enthusiasm, but to a confidence of result, based on testimony and experience, in the midst of disturbing elements.

As to marriages and births, we shall not have time to analyze the figures, a work needing much to be done, but for which the present State provision is not sufficient. The records are so made, however, as to be fully available, if, at the end of years, any competent statistician should be put at work upon them for only a single year.

As they are now studied they are available as showing their bearing on the combinations of populations and on increase, and as defining the conditions and age of material with which disease and death have to deal. It was an advance when we also secured through the census a record of the number of houses in each city and township, the number of families, and the number of individuals in each. It is a great thing to have collected the materials in such form as that the future student can find them available when public sentiment and the

State authorities conclude that such statistics are vital to the general interests of population and progress. The large number of facts thus collected over a series of years will also render the conclusions therefrom more reliable than they could be with small numbers and brief periods of time.

We shall therefore confine ourselves to the consideration of the returns of deaths, and the uses to be made of them in conserving the health interests of the State.

They are valuable *en masse*, or in their entirety, first as indicating the general mortality of the population, and the diseases by which it is limited or destroyed. We desire to emphasize the words *en masse*, or entirety. Nothing can be more subversive of the real use of statistics than a wholesale statement of the number of deaths per thousand and an inference of sanitary conditions therefrom, unless the population on which they are based is 100,000 or over, and unless right alongside there is a statement as to the diseases which have occasioned the deaths, the age of the material exposed, and the ages of those dying. The death-rate in gross is merely the statement of a leading fact, which is to form a nucleus for the arrangement and comparison of other statements, both as to mortality and morbidity. We are not to stop with the statement of the facts, but to go to work to analyze causes and to consider facts which will make them more or less significant. If, for instance, it appears that the great excess of mortality had been caused by an epidemic of small-pox, it would not tell against the general healthfulness of the locality, but would tell against the sanitary administration of the town, which should have seen to it that vaccination was prevalent instead of the small-pox. If the increase has been owing to an epidemic of measles, this again would not lead to any conclusions as to sanitary conditions or general unhealthfulness; but it would lead to a study of the cases in their relation to climatological conditions, and to a study of any special causes of excessive mortality, such as the age of those attacked, their peculiar exposure by reason of bad housing or surroundings, and as to whether the fatality was chiefly from pulmonary lesions. If, in every epidemic of measles, through a score of years, any place averaged an excessive mortality, it would lead to the conclusion that locality or the particular climate had something to do with it. At least, let no physician or citizen get it into his head that the death statistics are only designed to show the

sanitary condition of the locality. In a sphere, and properly used, they show him much about this, but many things more important.

But, independent of special epidemics, there are still other considerations.

The vital statistician, getting the aggregate of deaths before him in sufficient numbers, for long periods of time, then studies the class of diseases, the number of deaths in proportion to the population at each classified age, the causes of death as compared with each class of age and of persons, and so brings the problem far more within the range of definite information and certainty. With this kind of analysis the statistician may be able to see where to look and what to look for before other people, just as the astronomer anticipates, on the basis of calculation, the appearance of a comet.

Our marauding pestilences resemble comets in some particulars, and have their orbits and their laws as well.

But nothing is more unsatisfactory than the conclusions as to the health of populations under 100,000, derived merely from the general statement of the death-rate. On July 1st, 1888, we completed the vital statistics for ten years, or our first decade of registry. If we will now unite the death-rates for the ten years, if we will then reckon the periods of life in proportion to population at which each series of deaths has taken place, and the numbers from each disease, and locate as far as possible the special areas which show the highest mortality, we shall then have some very important guides to conclusions.

Even before this is done we are able to give prominence to the significance of certain facts. An average general death-rate from fevers has especial significance, and especially from typhus, typhoid and remittent or miasmatic fevers. These are especially fevers likely to be identified with local conditions, so much so that typhus has unmistakable relations to animal life and excretions—that typhoid was called by Murcheson pathogenic or putridity fever, often, as he thought, “generated spontaneously by fecal fermentation;” and the remittents have been and still are regarded as related to paludal conditions. The last English report speaks of typhoid fever as the “best single test of sanitary condition.” The only limiting item as to the two former is that they may have been imported, but even this item can be calculated, and if there is great spread, it points usually to bad local conditions or bad sanitary administration which admits of

characterization. The limiting factor as to conclusions in respect of the paludal fevers is that the number of deaths is not a uniform index to the number of cases or the prevalence of the cause. Knowing this, however, where deaths occur it is not difficult to get an estimate of the amount of sickness from this cause.

Next in significance we should place diarrhoeas and dysenteries, which, if studied by persons, ages and localities, are uniformly found indicative as to local or preventable causes of disease. Next we should place diphtheria, since an increasing number of facts identify it as frequently having local origin and as related to inclosed dampness amid decayable materials. The figures of Bowditch and Buchanan as to tens of thousands of cases also show that statistics of consumption followed through years point largely to soil-moisture, bad drainage and organic vegetable matter, while the statistics of Greenhow, Hurt, &c., show how in cities the element of foul air influences these diseases among indoor operatives. Then following on with other preventable diseases and giving to each its real significance, it is not suprising that the specialist in these departments is able to reason as accurately as in any other department in which results are partly mathematical and partly experimental, and so come to be the facts of analysis and of experience. Nor is it enough to make one division of preventable and non-preventable diseases and study each as a unit. Both of these classes have their own special significance, and are to be compared with each other and then those of each class among themselves. Given, that a disease has been brought to a place and so had its origin independent of the locality and the people residing in it. Yet vastly much as to the number of cases or deaths will depend upon the general sanitary condition of the locality, and still more in some cases upon the prompt recognition of cases, the enforcement of isolation and all the detailed rules of the efficient Sanitary Inspector. Non-preventable diseases are in some respects as to the degree of fatality just as controllable by efficient health administration as are the class known as preventable diseases. With the number of deaths before us in any given locality we do not at once conclude that all is owing to the insalubrity of the locality, or to some one or more special epidemics brought there, or to errors in isolation and sanitary inspection. But with the numerical facts as the basis for inquiry we make other inquiries, and very often are able to find that some one physician in town has stayed an epidemic, or some

Board of Health or Inspector by promptness or by neglect has determined the series of events that have happened.

We next inquire as to the deaths recorded in this State for the past ten years, what tables of most value can be constructed from them, and should be, so far as the provisions for this particular object will permit.

They should be, first, total number of deaths, with ages and principal causes. The divisions we have are, under one year, one to five, five to twenty, twenty to sixty, over sixty. As certain specified or principal diseases, we tabulate all the so-called communicable diseases, with diarrhoea and consumption, and a few others that relate to organs or systems, as the circulating system, the digestive system, &c. It would be better, after five years, to go by decades, but it makes far more work than is provided for, and the classification as we have it is not misleading.

The next item after statement of the deaths of each locality and at specific ages from each disease, and after the comparative statement of the same, is to ascertain what proportion of the deaths comes within the category of preventable diseases, and to give due weight to each of these. This, in decennial statements, is best done by giving the deaths from each so-called preventable disease, so that combinations may be made in order and due importance given to each, and then the whole massed and the proportions shown.

Whoever will compare the reports made on vital statistics by this Board, and read each outline of method and reasons therefor, before seeking to study tables, will, we think, find a key to method which will be valuable. With this should be read the special article on the Study of Consumption as a Preventable Disease, and the one on English Statistical Reports, contained in the fifth report (1881). Such comparisons, for instance, as those on pages 253-4, continued through a series of years, cannot but reveal the relations of locality to consumption, and point to a still further analysis of causes, both in city and country. The same will apply to fevers, to diarrhoea, to diphtheria, and measurably to some other diseases.

It is easy to claim that by reason of errors or defects of return, you cannot draw safe deductions from imperfect data. This sounds quite conclusive. But, if absolutely true, some of the best-sustained mathematical formulas which depend upon the balancing of errors and the elimination of disturbing quantities, become annihilated. Some of

the tests which experience has shown as confirmatory to these deductions, would become inexplicable.

Farr, after forty years of experience, and after submitting his conclusions to the examination of the first mathematicians of his age, is not mistaken when he says: "The deaths and causes of death are scientific facts which admit of numerical analysis."

Again, after twenty years of registry, he says: "We have now before us the results of observations in a certain class of phenomena. They are as valuable as the experimental philosopher could have deduced from his experiments if he had had the power to expose the population to great vicissitudes of heat and cold, of dampness and dryness; to changes incidental to differences in the price of food; to air and water in different degrees of impurity, and to destructive epidemics."

This is another illustration that, in studying statistics, we are seeking in general the causes of all disease, and not merely those incident to the locality. It is all the more important because the finding of cause has so much to do with prevention, as also often with cure.

If any of the statisticians could by any possibility be accused of infatuation in their chosen pursuit, that cannot be said of those students of sanitation such as Varrentrap, Simon, Buchanan, Russell, Baker and many others who, as practical administrative officers, have recognized these as among the finger-boards directing to practical sanitary measures, although themselves not directly concerned with their collection or analysis.

What shall be done by Local Boards of Health in their relation to the vital statistics of the State?

I. They should be careful not only to encourage but to secure their accurate and complete collection. It is not to be expected that every member of a Health Board can or will understand their full import. But inasmuch as their full collection accords with the common sentiment—"communis sensus"—of sanitary students and practical administrators and sanitarians, the fact of the necessity should be accepted.

II. They should be careful not to have the citizens base conclusions upon these alone. They should tell such citizens that a place may have in it causes of ill-health and for reducing the vigor of population that do not express themselves in a death-rate, or express themselves only at remote periods or by some sudden outbreak, and that

while they give important information and indications, they are not alone and in themselves the full tests of salubrity.

Lord Stanley puts it thus :

“Do not fancy that the mischief done by disease spreading in a community is to be measured by the number of deaths which ensue ; that is the least part of the result, as in the battle the killed bear but a small proportion to the wounded. It is not merely by the crowded hospitals, the frequent funerals, the destitution of families or the increased pressure of the public burdens that you may test the sufferings of a nation over which sickness has passed ; the real and lasting injury lies in the deterioration of the race, in the seeds of disease transmitted to future generations, in the degeneracy and decay which are never detected until the evil is irreparable.”

III. In each Board, and especially in each city Board, some one should be studying the subject of vital statistics as described in at least eight reports of this Board and elsewhere, as well as in the tables furnished in these reports. These tables are often only the material for further calculations to be carried on by those into whose hands they fall in localities.

IV. In each city, or wherever there is density of population, the local record should show the number of the house as well as the street at which each death takes place, and the cause of death. For present purposes, as a rule, the report of any death in a house having more than one family in it should at once lead to a visit of the Sanitary Inspector, and for future statistical and sanitary purposes a map should show the locality of each case. Such record-maps of disease are invaluable. At the time it is not difficult for the Sanitary Inspector to get a record of other cases of sickness that do not prove fatal, and this should be preserved for reference, and really made use of when the local statistician comes to make up his yearly statement. Physicians, too, if called upon at the time, are ready to give information as to cases ; and where a disease is coming to be epidemic, and in the case of larger cities, in all the more communicable and dangerous diseases, report should be required, so that the sanitary officer may know just what is happening. Let any local health officer thus study some of the facts for immediate use, and others to be arranged and studied out at the end of the year, and from year to year combined as they accumulate, and he himself is surprised at the satisfactory and informative character of the results. We believe that one great reason why

statistics are not more appreciated by the laity is that they see no practical studies of them or results from them. Figures go far with the mathematician, but to ordinary minds they go a great deal further if a map delineates their results, or if a verbal statement accompanies them.

No health office of any large city is complete in its work unless it does something of this kind. The annual local statement to the public should tell how many have died at each five years of age, of what disease, the number of the house, how many inmates it had, and should be accompanied by such suggestions as to causes and as to sanitary needs, as the facts may warrant. It should also occasionally point out that while these statistics are valuable as an aid to the study of local conditions, they are also valuable in the study of the effects of age, heredity, types of disease, food and milk-supply, weather, medical skill or carelessness, and as throwing light on various other matters that concern the welfare of the population. Simon remarks, among other things, that the death certificate, while aiding in various health directions, is also a mild coroner law for all the Kingdom. We are apt to find fault with imperfections or neglect of returns, but so far as deaths are concerned, we believe these to be more complete than the use made of them in studying various phases of social life and the varying conditions of personal and public health.

When a citizen sees a statement that the death-rate in his city was only twenty-five per 1,000 the past year, let him know that such bare fact does not, to him, indicate very much as to healthfulness. The statistician does use it as one of many facts for comparison, and if, for instance, as is the case, he finds the death-rate of London, with its five and a half millions of people, only 17.5 per 1,000, he does bear in mind the contrast. But with this as only a starting-point, he goes on to compare ages of death, so as to know how the significance of number is modified by the significance of age. He then proceeds to find how both of these are modified by the significance of diseases, as deaths by some diseases mean far more, as to local sanitary conditions, than is meant by the same number of deaths from some other diseases. But the statistician gets on. He then asks in what part of the city, in what kind of houses, they died, and what were their advantages or disadvantages as to food, water and care. He also, as far as possible, inquires into heredity, vitality, into the rate of sickness as compared with the death-rate, and into other indications which

show how the general race vitality and general working-age, and how the endurance of the population are being affected ; for these are not always in exact proportion to the number of deaths.

The evils of statistics are the drawing of hasty and unauthorized conclusions from them. Their value is that in their study, comparison and assortment, they furnish to us some of the valuable materials which, joined with other information, enable us to practically deal with the limitation and prevention of disease.

Thus, by restraining the people, and sometimes ourselves, from hasty generalizations, and by using the records as parts of evidence and only for purposes intimated, we shall find them highly valuable in aiding in the prevention and the cure of disease, and in guarding the life, health and welfare of population.

HOW TO RECKON AS TO THE REAL OR COMPARATIVE HEALTHFULNESS OF COMMUNITIES.

There are various methods which aid us in ascertaining what are the health conditions of particular localities, or of a whole State. To the superficial observer it cannot but seem that there are many sources of error. The student of mortality or of morbidity is not slow to perceive what these disturbing elements are, and to set himself to work so to estimate and allow for them as to arrive at a conclusion sufficiently approximate to be valuable.

The skilled physician is seldom able to make his diagnosis depend upon one unfailing or pathognomonic symptom. It is by his skill as a clinician that he is able to collect the evidence, to sift its meaning, to give to each symptom its due import, and thus to sum up his evidence into a correct diagnosis. Even if the diagnosis is not absolutely perfect, in the process, he gains much valuable aid and direction as to treatment. It is just so in dealing with locality, climate, character and age of population, records of disease, and of marriages, births and deaths. The student of vitalities has before him material for assortment, and acquires, or ought to acquire, a skill which enables him to estimate its significance.

The science of statistics has very many notable names that have illustrated this acquired facility, and has predicated upon it principles and foretold results which have been justified by experience. Perhaps no man of this century has more fully exhibited this than Dr. Wm. Farr. In 1839 he was appointed superintendent of the statistical department of the Registrar-General's office, England, which included the decennial census and the vital returns for England and Wales. He brought to the service a mind of wonderful mathematical capacity, a professional knowledge of great exactness, and an enthusiasm of industry which made him diligent in his search for facts, and exact

and expert in his methods of dealing with them. During his forty years of continuous service he was often under the fire of sharp and able criticism, and often for years had to be on the defensive as to propositions he made and theories that he claimed to have established. It is enough to know that his methods and conclusions are, to a large extent, accepted as fundamental bases to the sanitary legislation of England, and that vital statistics are always accounted as indispensable in making up the record and guide for methods of practical administration.

It is always to be borne in mind that the vital statistician does not claim his records as the only tests of the conditions of population. He of all others looks to the actual facts as to locality and surroundings, as to nationality and age, as to all social conditions, as to heredity and occupation. Indeed, while stating in figures or by diagram the marriage-rate or birth-rate or death-rate, he studies alongside of these all those modifying factors that come into the calculation.

No one can read such books as Quetelet or Todhunter on probabilities, or the collected papers of Wm. Farr on vital statistics, or such criticisms as those of Dr. Letheby, or Rumsey's essays and papers on some fallacies of statistics, without seeing how thoroughly the subject has been elucidated and tested, or upon what firm and tried foundations rest the principles of the science and the applications of the art. For instance, rules for supplying the acknowledged defects in returns have been so thoroughly tested that within prescribed limits it is shown that even in a large local failure, or in a more general incompleteness, from other facts it is possible to reckon the actual deficit. Even where such reckoning is not made there is a sense in which deductions secured from what are received are correct for the whole, just as it is, as a rule, safe to sample a year's crop of wheat in a single State by specimen bushels from every district. Even though some small district may not have furnished a fair sample, the aggregate for the whole State, either as to quantity or quality, would not be misleading. It is for this reason that great importance is to be attached to the combination of statistics secured on a uniform plan for long series of years, since thus the errors of small amounts are balanced or eliminated. Yet, for localities, as for streets of cities, there is need of an accurate record of population, of character of population, as to age, &c., and as to deaths and sickness each week, since these actual occurrences can often lead to rapid sanitary relief.

Experience has shown, as Mr. Humphrey, the editor of Dr. Farr's papers, states it, "That the death-rates in urban populations, at all ages, unless corrected for difference of age-distribution, invariably understate their real mortality ; while, for the same reasons, the death-rates in rural districts, unless corrected, overstate their true mortality. * * * While, however, the uncorrected death-rate at all ages is, for comparative purposes, open to objections, death-rates at groups of ages are practically free from such objections."

HOW TO CALCULATE ESTIMATED POPULATIONS.

Inasmuch as it is the custom to state proportions of marriages, births and deaths by the number occurring in each thousand of the people, the question often arises as to the need of frequent estimate of population and the basis on which it is to be made. The general basis must certainly be a census taken, as nearly as possible, in a single day, or week, and with all possible exactness. As our census is a quinquennial one, we have some advantage over English and Continental methods, which have to be adjusted to a decennial count. We also, in this State, have a census of the number of dwellings, and thus have some additional facts as to the proximity of population. As the vital returns of this State are reckoned from July 1st, 1878, and as the times of census are 1880 and 1885, our quinquennials cross the period of the census, and are therefore more approximately correct as to proportions. There are other modifications which arise from the varying growth of particular cities or districts, or from the effects of the ingress of foreign population.

Instead, therefore, of presenting an estimated population for each year, it has been deemed best for the yearly State report to take the quinquennial returns as the basis for each half decade and decade, not, however, without keeping such condensed account of estimated population as will enable us to determine eventually when and how far such calculations for each locality would form a more correct estimate.

HOW TO ESTIMATE POPULATION.

It is, however, often important for localities, and especially for the larger cities, to be able to correct and estimate returns on the basis of an estimated population for each year. In these localities they are

able to keep an account of many facts as to increase, such as the number of houses constructed and occupied and their character, the number of emigrants arriving, the increase in the voting population, and various other items that come into notice in a local way. They are also able more fully than a central authority to keep account of such deaths in institutions as should not be charged to the local account, except so far as they represent locality.

It needs also, however, to be borne in mind that as a rule, the statement of death-rate is more apt to fall short of the real number than to exceed it. Under the most perfect system some deaths will escape registration. From the traveling habits of our nation, and especially of our State, the frequent changes of residence, and the great use made of summer resorts, deaths often occur away from the place of residence and are returned to some other State or some sparser locality. Besides, by their absence from the insanitary condition of their city houses, many are saved from sickness and death, and so the death-rate fails to be a full index of the real evils. A careful noting of the course of vital events, leads us to believe that the State reports do not overstate the actual ratio of deaths to population. This is confirmed by comparisons of special localities for a series of years. The tendency which every locality has to report a low death-rate, often leads unconsciously to the allowing of greater significance to the facts that would reduce the proportion than to those that might increase it.

With the quinquennial records of the census as the basis, we herewith give suggestions or rules as to intermediate estimates.

The most general rule, and one applicable to country districts, or those not liable to sudden changes, is to add to the population of the last census a fifth of the difference between that and the preceding census for each intermediate year. Thus, for 1886 we would add a fifth of the difference between the census of 1880 and 1885. For 1887, 1888 and 1889, a fifth more respectively, leaving the census of 1880 to stand for that year. But for large populations this apportionment does not represent the rate of increase. In other words, it does not allow for the fact that, say, the 3,000 increase of 1886 is itself a new source of increase, and therefore will add for 1887 an increase of its own not expressed in the former division. To meet this, Dr. Farr had recourse to a logarithmic method which has been found available. It is thus illustrated: "Instead of taking the difference between the population enumerated in 1871 and 1881, the

difference between the logarithm of those numbers affords the true method for ascertaining the *rate* of increase. Thus, the population of Sheffield for 1871 was 239,946, and had increased to 284,508 in 1881. The logarithm of the population of Sheffield in 1871 is 5.3801136, and that of the population of 1881 is 5.4540945. The difference between these logarithms is 0.0739809, which is the logarithm of the rate of increase of population in Sheffield during the ten years 1871–81. If this logarithm of the rate of increase be added to the logarithm of the population in 1881, the number corresponding to the new logarithm would be the estimate of the population at the census of 1891, which would, on this basis, be 337,346 (or 52,838 more than the enumerated population in 1881). (The other method would make the increase the same as in the previous decade—that is, 44,562 instead of 52,838 by the Registrar-General's method). Having obtained the logarithm of the ten years' increase (0.0739809), a tenth of this will give us the logarithm of the annual rate of increase; by inserting a cipher to the left of the logarithm we shall divide it by ten and 0.00739809. When once the annual rate of increase is obtained by logarithms, subsequent processes may be carried on by common arithmetic if preferred. For instance, the number to the logarithm of the actual rate of increase of population of Sheffield is 1.0170416, signifying that the rate of increase is equal to 1.70416 per cent. per annum."

As to proportions of sex, age and conjugal conditions, it has been found that these change so slowly that it may be assumed that the *proportions* found to exist at one census are maintained in the next. This is believed to be still more true at quinquennial intervals. Thus, the calculations in these regards for each year, if desired, are much simplified.

CLIMATOLOGY.

In order to afford data by which variation in diseases may be compared with variations in climate, the reports of this Board give the various climatological records in localities chosen as representative. In such a plan it is not needful to survey all the scope of the meteorologist, who studies the science which treats of the atmosphere and its phenomena, but rather deal with climate and causes which modify it in a particular place, or with weather as denoting different degrees of temperature, humidity, winds, cloudiness, rains, snows. While various facts appear in all the reports, attention is particularly called to the division Climatology in the fifth report, and to the article on "Comparative Facts in Climatology and Geology," in the sixth report, pages 269-284. It is to be remembered that climate is not the mere expression of atmospheric conditions, but has to do with distance from the equator, elevation, the distance from the sea or large bodies of water, prevailing winds, the character and contour of the geological structure and of the soil, the natural or artificial drainage, the amount of forests, the cultivation of the soil, the access of light and heat, &c.

As the geological structure and soil of New Jersey are so arranged as to admit of quite consecutive divisions, we have adhered as far as possible to the selection of localities representative of ground formation, and then associated with this a regard for varieties of location as to temperature, rainfall, &c.

Thus, at first, Newton, Sussex county, was taken to represent the Kittatinny valley and the sandstone, slate and adjacent rock, as well as our more northern and rocky country.

Paterson, located on trap-rock, well represents some slight variations from the same district, and the two mostly the azoic and paleozoic formation.

Newark represented the eastern boundary of the red sandstone section.

New Brunswick, Princeton and Trenton represent the western red sandstone section.

Freehold, amid the sand and clay marls, represents the cretaceous formation and the inland parts of Monmouth county.

Vineland shows us the tertiary formation, and the inland climate of the pine regions.

Cape May, so long as the Signal Service was maintained there, afforded evidence as to our lower Atlantic sea-coast.

Sandy Hook represents our northern Atlantic coast, and the mingling of sand and lower clay marls.

Sometimes, by reason of changes in observers or from other causes, we have added or substituted and used the facts to be gathered from New York city, Beverly, Philadelphia and Atlantic City. But we have always kept in view the character of geological structure and the comparison as to land and sea, mountain and plain, height above sea-level, and position of latitude.

For this year we give the same tables as formerly, with one or two variations. But as this is the first decennial of our vital statistics, we also combine in one result the testimony of the various localities for the ten years, and for each year of the ten, so as to admit of local and general comparisons with the records of deaths.

In order to secure an accurate reckoning of these data and their most efficient use, we have been aided by Capt. E. W. McGann, of the United States Signal Service, now stationed at New Brunswick. He has also the advantage of former observations in this State, and has, with skillful zeal, assisted in the work. His monthly bulletin on the weather for each month of our statistical year, from July 1st, 1887, to July 1st, 1888, will be found valuable.

While the beginning of a new decade will give us the opportunity to avail ourselves of some new observers and fuller data, we shall only seek to record the observations at eight or ten points as standards for comparison. It is equally important that the Local Boards of cities should study the relations of climate and weather to their weekly and quarterly returns of disease and death, so as to obtain information which will help them afterward in forestalling the sicknesses that are plainly affected by climatic conditions.

CONDENSED CLIMATOLOGICAL RECORDS FOR TEN STATISTICAL YEARS

Beginning July 1st, 1878, and ending July 1st, 1888.

STATION, NEWTON, N. J.

Latitude, 41° 2' N.; Longitude, 74° 43' W. Height of Barometer Cistern above Sea Level, 660 feet.

OBSERVERS, MISS E. FOSTER and MR. FOSTER, SR.

(FOR NINE YEARS.)	BAROMETER. Reduced to 32°.			THERMOMETER.				Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equalled 0.01.	Cloudy Days.
	Mean.	Max.	Min.	Mean.	Max.	Min.	Absolute Range.						
1878-79	29.267	29.960	28.138	48.6	92.0	8.0	89.0	77.5	S. W., N. W.	113.92	33	121	116
1879-80	29.267	29.960	28.138	54.0	96.0	8.0	91.0	68.3	S. W.	115.89	26	83	111
1880-81	29.167	29.997	28.332	48.9	95.0	8.0	90.0	73.8	S. W.	43.74	...	98	151
1881-82	29.296	29.983	28.552	52.4	99.0	6.8	92.2	73.1	S. W.	41.86	...	139	143
1882-83	29.290	29.932	28.496	50.4	96.1	0.2	95.9	65.2	S. W.	41.25	26	140	113
1883-84	29.307	29.996	28.336	50.3	97.9	0.0	97.9	65.2	S. W.	51.74	41	142	91
1884-85	29.260	29.939	28.403	49.0	98.6	-5.0	101.5	64.8	S. W.	122.46	...	130	97
1885-86	29.224	29.976	28.082	50.8	100.0	-7.0	107.0	69.3	S. W.	...	191	131.3	115
1886-87	...	...	...	50.0	96.9	0.7	96.2	...	...	...	...	...	...
Means	29.260	...	...	50.5	...	...	...	69.3	S. W.	...	191	131.3	115
Extremes	29.224	29.987	28.082	50.8	100.0	-7.0	107.0	...	...	...	...	...	...

* Including melted snow. † Mean for four months. ‡ Total for four months. § Total for six months. || Total for nine months.

STATION, PATERSON, N. J.

Latitude, 40° 55' N.; Longitude, 74° 11' W. Height of Barometer Cistern above Sea Level, 142 feet.

OBSERVER, JOHN T. HILTON.

(FOR TEN YEARS.)	BAROMETER. Reduced to 32°.			THERMOMETER.				Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equalled 0.01.	Cloudy Days.
	Mean.	Max.	Min.	Mean.	Max.	Min.	Absolute Range.						
1878-79	50.0	95.0	9.0	79.0	...	...	47.80	...	115	...
1879-80	54.3	94.0	9.0	83.0	...	...	45.32	...	110	...
1880-81	50.4	93.0	-5.0	99.0	...	...	83.48	...	114	...
1881-82	52.4	98.0	-6.0	103.0	...	...	62.69	...	130	...
1882-83	49.6	96.0	0.0	96.0	...	...	73.18	...	130	...
1883-84	50.9	97.0	0.0	92.0	...	...	43.20	...	117	...
1884-85	49.0	98.0	-4.0	97.0	...	N. W.	58.83	14	93	...
1885-86	52.3	96.0	0.0	96.0	...	S. W.	62.63	14	104	...
1886-87	51.4	94.0	16.0	73.0	...	...	41.68	20	107	...
1887-88	50.3	92.0	0.0	92.0	...	...	53.71	17	107	...
Means	51.2	...	...	92.0	...	...	64.26	16.2	111.2	...
Extremes	55.0	98.0	-6.0	104.0	...	...	83.48	...	113	...

* Including melted snow.

STATION, NEWARK, N. J.

Latitude, 40° 44' N.; Longitude, 74° 10' W. Height of Barometer Cistern
above Sea Level, 35 feet.

OBSERVERS, W. A. WHITEHEAD and F. W. RICORD.

(FOR TEN YEARS.)	BAROMETER. Reduced to 32°.			THERMOMETER.				Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.1.	Cloudy Days.
	Mean.	Max.	Min.	Mean.	Max.	Min.	Absolute Range.						
1878-79	29.954	30.78	28.84	53.7	94.9	-2.0	106.2		N.W., S.W.	46.10		128	98
1879-80	30.057	30.70	28.83	53.4	99.3	8.0	91.2		N.W., S.W.	41.07		94	93
1880-81	30.023	30.85	29.17	49.2	96.0	-5.0	101.0		N.W., S.W.	47.95		115	92
1881-82	30.064	30.80	29.35	53.6	100.5	3.0	97.5		N.W., S.W.	36.33		115	73
1882-83	30.130	30.93	29.55	51.2	98.5	3.5	94.5		N.W.	51.82		110	149
1883-84	30.015	30.90	29.22	51.4	97.0	2.0	95.0		N.W.	46.03		104	225
1884-85	30.093	30.80	29.15	51.0	93.0	0.0	93.0		N.W.	39.87	19	90	128
1885-86	29.999	30.78	28.90	53.9	99.0	-2.0	101.0		N.W., S.W.	50.01	18	99	195
1886-87	29.996	30.96	29.20	52.5	91.8	8.5	89.5		N.W.	43.34	23	51	184
1887-88	30.080	30.90	29.31	51.8	96.0	2.3	93.7		N.W.	61.31	29	116	200
Means	30.037			52.1			95.6		N.W.	46.33	123.5	105.5	129.6
Extremes		30.96	28.80		100.5	-5.0	101.0			51.82	33	128	225

* Including melted snow.

† Mean for four years.

STATION, NEW BRUNSWICK, N. J.

Latitude, 40° 29' N.; Longitude, 74° 27' W. Height of Barometer Cistern
above Sea Level, 115 feet.

OBSERVER, GEORGE H. COOK.

(FOR TEN YEARS.)	BAROMETER. Reduced to 32°.			THERMOMETER.				Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.1.	Cloudy Days.
	Mean.	Max.	Min.	Mean.	Max.	Min.	Absolute Range.						
1878-79				50.1	95.0	-8.0	103.0		W., S.W.	39.83			
1879-80				52.8	95.0	8.0	93.0		W., S.W.	29.33			
1880-81				48.7	95.0	-8.0	103.0		W., S.	44.93			
1881-82				52.2	103.0	-3.0	106.0		W., S.W.	34.78			
1882-83				47.9	95.0	3.0	92.0		E., W., S.W.	49.12			
1883-84					91.0	2.0	89.0			46.43		145	
1884-85					90.0	2.5	87.5			38.14		128	
1885-86					94.0	-1.0	95.0			47.13		125	
1886-87				50.3	93.0	1.5	91.5			41.01		120	126
1887-88				49.9	96.0	-2.5	99.0			51.32		105	74
Means				50.3			99.9		W., S.W.	42.20		125.3	100
Extremes					103.0	-8.0	111.0			51.32		145	

* Including melted snow.

† Mean of seven years.

STATION, SANDY HOOK, N. J.

Latitude, 40° 28' N.; Longitude, 74° 0' W. Height of Barometer Cistern
above Sea Level, 28 feet.

OBSERVER, U. S. SIGNAL SERVICE.

(FOR EIGHT YEARS.)	BAROMETER. Reduced to 32°.			THERMOMETER.				Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Mean.	Max.	Min.	Mean.	Max.	Min.	Absolute Range.						
1878-79.....	29.978	30.78	29.77	51.6	97.0	-3.0	100.0	73.7	W.	60.37	.....	127	112
1879-80.....	30.044	30.77	29.33	65.3	96.0	10.0	86.0	72.8	S. W., N. W.	46.75	.....	118	118
1880-81.....	29.994	30.80	29.02	50.8	92.0	-6.0	97.0	73.6	N. W.	53.14	.....	126	107
1881-82.....	30.040	30.83	29.21	54.5	101.0	0.0	101.0	74.3	N. W.	46.20	.....	140	95
1882-83.....	30.043	30.75	29.24	52.0	92.5	3.0	89.5	76.2	N. E., S. E.	48.23	.....	124	83
1883-84.....	30.034	30.83	29.10	52.0	95.0	6.5	89.5	73.3	N. W.	48.42	.....	143	88
1884-85.....	30.026	30.83	29.08	50.5	94.1	0.5	93.5	73.3	N. W.	41.83	.....	124	83
1885-86.....	29.975	30.81	28.77	51.2	96.7	-2.2	98.9	79.4	N. W.	55.87	12	141	68
Means.....	30.017	.....	.....	52.2	.....	.....	.....	74.5	N. W.	50.08	.....	131.6	95.3
Extremes.....	.....	30.83	28.77	.....	101.0	-3.0	105.0	.....	.....	.....	.....	143	112

* Including melted snow.

STATION, BEVERLY, N. J.

Latitude, 40° 04' N.; Longitude, 74° 55' W. Height of Barometer Cistern
above Sea Level, 40 feet.

OBSERVER, C. F. RICHARDSON.

(FOR FIVE YEARS.)	BAROMETER. Reduced to 32°.			THERMOMETER.				Mean Humidity.	Prevailing Wind.	Rain (inches).	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Mean.	Max.	Min.	Mean.	Max.	Min.	Absolute Range.						
1883-84.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1884-85.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1885-86.....	30.150	.....	.....	51.4	100.0	-4.0	104.0	74.6	N. W.	50.98	.....	117	.....
1886-87.....	30.201	30.760	29.460	51.8	94.0	4.0	90.0	75.0	N. W.	40.52	.....	124	104
1887-88.....	30.240	30.730	29.460	51.0	99.0	0.5	98.5	75.1	N. W.	47.22	15	123	100
Means.....	30.198	.....	.....	51.4	100.0	-4.0	97.8	75.2	N. W.	46.24	15	121	107

* For five months 1886. Means for three years.

REPORT ON VITAL STATISTICS.

STATION, VINELAND, N. J.

Latitude, 39° 29' N.; Longitude, 75° 1' W. Height of Barometer Cistern
above Sea Level, 111 feet.

OBSERVERS, J. INGRAM, M.D., and O. H. ADAMS, M.D.

(FOR TEN YEARS.)	BAROMETER. Reduced to 32°.			THERMOMETER.				Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Mean.	Max.	Min.	Mean.	Max.	Min.	Absolute Range.						
1878-79.....	29.89	30.60	28.66	52.9	96.0	-4.0	100.0	75.4	S. W.	45.10	.....	108	.....
1879-80.....	29.91	30.59	29.01	57.1	97.0	10.0	87.0	73.0	S. W.	47.00	.....	105	.....
1880-81.....	29.84	30.60	28.63	50.0	98.0	-10.5	108.5	72.0	S. W.	50.99	.....	103	.....
1881-82.....	29.94	30.67	29.08	56.2	104.0	0.0	104.0	65.4	S. W.	40.56	.....	98	.....
1882-83.....	29.92	30.61	29.14	58.4	96.0	4.6	91.0	68.0	S. W. N. W.	54.11	.....	108	.....
1883-84.....	29.90	30.66	28.65	54.2	98.0	4.0	94.0	63.3	N. E. S. W.	56.79	.....	116	139
1884-85.....	29.93	30.68	28.92	52.0	97.0	-4.0	101.0	73.4	S. W.	32.34	.....	82	108
1885-86.....	29.88	30.65	28.52	58.0	100.0	-10.0	110.0	73.1	S. W.	43.99	.....	86	102
1886-87.....	29.95	30.70	29.42	56.6	93.0	6.0	86.0	75.9	S. W.	44.96	.....	86	94
1887-88.....	29.96	30.76	29.34	53.5	97.0	3.0	94.0	78.1	N. W.	49.21	.....	80	82
Means.....	29.92	.....	.....	55.6	.....	.....	.....	73.5	S. W.	47.41	.....	95.8	†107.6
Extremes.....	.....	30.76	28.52	.....	104.0	-10.0	114.0	.....	.....	60.99	.....	116	139

* Including melted snow.

† Mean for five years.

STATION, CAPE MAY, N. J.

Latitude, 38° 56' N.; Longitude, 74° 58' W. Height of Barometer Cistern
above Sea Level, 27 feet.

OBSERVER, U. S. SIGNAL SERVICE.

(FOR SEVEN YEARS.)	BAROMETER. Reduced to 32°.			THERMOMETER.				Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Mean.	Max.	Min.	Mean.	Max.	Min.	Absolute Range.						
1878-79.....	29.998	30.74	28.84	53.5	90.0	1.0	89.0	74.7	N. W.	42.44	.....	116	108
1879-80.....	30.060	30.81	29.24	57.0	89.0	12.0	77.0	74.6	S.	50.91	.....	120	106
1880-81.....	30.000	30.76	29.03	52.2	90.0	2.0	88.0	75.4	N. W.	60.54	.....	144	130
1881-82.....	30.038	30.84	29.18	56.3	87.0	6.0	82.0	76.0	N. W.	40.87	.....	144	128
1882-83.....	30.048	30.74	29.28	54.7	86.0	11.0	75.0	77.1	S.	54.83	.....	137	78
1883-84.....	30.002	30.77	29.12	53.6	89.0	11.0	75.0	78.7	N. W.	47.79	.....	125	68
1884-85.....	30.020	30.79	29.21	53.2	89.0	4.0	84.5	79.6	S.	40.83	.....	113	74
Means.....	30.023	.....	.....	54.4	.....	.....	.....	76.6	N. W.	45.39	.....	119.1	100.
Extremes.....	.....	30.84	28.81	.....	90.0	2.0	89.0	.....	.....	60.54	.....	144	.....

* Including melted snow

Note.—Station discontinued October, 1885.

STATION, ATLANTIC CITY, N. J.

Latitude, $39^{\circ} 23' N.$; Longitude, $74^{\circ} 25' W.$ Height of Barometer Cistern above Sea Level, 84 feet.

OBSERVER, U. S. SIGNAL SERVICE.

(FOR FIVE YEARS.)	BAROMETER. Reduced to 32°.			THERMOMETER.				Mean Humidity.	Prevailing	Rain (inches).	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Mean.	Max.	Min.	Mean.	Max.	Min.	Absolute Range.						
1882-84	30.031	30.809	29.117	52.6	89.9	2.1	87.8	79.8	S. W.	58.70	.....	127	99
1884-85	29.989	30.813	29.079	50.6	90.9	4.0	85.9	83.7	N. W.	38.45	.....	116	88
1885-86	30.001	30.608	29.104	51.5	90.9	-2.5	93.2	82.3	S., N. W.	44.67	16	126	97
1886-87	30.051	30.947	29.155	52.1	91.5	7.0	84.5	83.0	S. W.	44.08	21	128	78
1887-88	30.039	30.860	29.130	50.6	97.0	10.0	87.0	83.0	N. W., S. W.	39.84	.....	129	71
Means	30.030	.....	.....	51.5	.....	.....	87.7	82.3	S. W., N. W.	44.13	.....	126	74
Extremes	.....	30.947	29.079	.....	97.0	.....	.....	.....	.....	.....	.....	.....	.....

STATION, BARNEGAT, N. J.

Latitude, $39^{\circ} 48' N.$; Longitude, $74^{\circ} 9' W.$ Height of Barometer Cistern above Sea Level, 20 feet.

OBSERVER, U. S. SIGNAL SERVICE.

(FOR SEVEN YEARS.)	BAROMETER. Reduced to 32°.			THERMOMETER.				Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of)	Days when Precipitation equaled 0.01.	Cloudy Days.
	Mean.	Max.	Min.	Mean.	Max.	Min.	Absolute Range.						
1878-79	29.996	30.76	29.80	50.6	94.0	-1.0	95.0	78.5	N. W.	49.28	.....	145	91
1879-80	30.060	30.79	29.08	53.4	96.0	10.0	86.0	78.7	N. W.	47.37	.....	153	107
1880-81	30.002	30.78	29.03	49.1	94.0	-7.0	101.0	78.5	N. W.	50.13	.....	158	120
1881-82	30.045	30.82	29.12	53.0	95.0	-1.0	97.0	78.9	N. W.	54.85	.....	139	118
1882-83	30.043	30.78	29.13	51.9	92.5	6.4	86.1	79.3	N. W.	50.78	.....	143	110
1883-84	30.080	30.83	29.09	52.0	91.0	7.0	84.0	82.1	S. W.	32.54	.....	152	103
1884-85	30.024	30.80	29.09	51.2	99.5	-0.2	99.8	80.6	N. W.	30.90	.....	132	78
Means	30.029	.....	.....	51.5	.....	.....	.....	79.6	N. W.	45.71	.....	145.9	105.6
Extremes	.....	30.83	29.03	.....	96.0	-7.0	105.0	.....	.....	60.13	.....	158	120

* Including melted snow.

NOTE.—Station discontinued December, 1885.

REPORT ON VITAL STATISTICS.

STATION, PATERSON, N. J.

Latitude, 40° 55' N.; Longitude, 74° 11' W. Height of Barometer Cistern
above Sea Level, 84 feet.

OBSERVER, WILLIAM FERGASON.

	BAROMETER. Reduced to 32°.			THERMOMETER			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1887.												
July	30.30	29.62	29.97	94	66	79	74	S.	6.75	17	10	10
August	30.30	29.65	29.98	89	55	71	69	N.	3.66	7	7	6
September	30.46	29.54	30.10	84	41	63	69	N. W.	2.30	11	9	9
October	30.46	29.50	30.02	78	32	55	65	W., N. W.	2.66	1	9	10
November	30.77	29.40	30.04	67	23	44	61	N. W., W.	2.04	1	7	7
December	30.92	29.26	30.10	56	13	36	71	N. W.	4.20	8	14	12
1888.												
January	30.53	29.46	30.16	54	2	26	71	W.	5.14	10	14	10
February	30.50	29.49	30.06	55	3	32	77	W.	4.03	10	15	8
March	30.56	29.38	30.04	63	5	32	74	N. W.	5.64	7	15	11
April	30.56	29.56	30.11	64	39	48	63	W.	2.67	2	11	5
May	30.32	29.72	30.01	83	41	58	75	S.	4.67	1	21	16
June	30.24	29.68	29.93	96	52	71	70	S.	1.65	1	7	4
For the year.			30.046			51.1	69.9	W., N. W.	45.64	38	144	108

* Including melted snow.

STATION, NEW YORK CITY, N. Y.

Latitude, 40° 43' N.; Longitude, 70° 0' W. Height of Barometer Cistern
above Sea Level, 168 feet.

OBSERVER, U. S. SIGNAL SERVICE.

	BAROMETER. Reduced to 32°.			THERMOMETER			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1887.												
July	30.30	29.62	29.97	94	66	77	74	S.	6.75	17	10	10
August	30.30	29.65	29.98	89	55	71	69	N.	3.66	7	7	6
September	30.46	29.54	30.10	84	41	63	69	N. W.	2.30	11	9	9
October	30.46	29.50	30.02	78	32	55	65	W., N. W.	2.66	1	9	10
November	30.77	29.40	30.04	67	23	44	61	N. W., W.	2.04	1	7	7
December	30.92	29.26	30.10	56	13	36	71	N. W.	4.20	8	14	12
1888.												
January	30.53	29.46	30.16	54	2	26	71	W.	5.14	10	14	10
February	30.50	29.49	30.06	55	3	32	77	W.	4.03	10	15	8
March	30.56	29.38	30.04	63	5	32	74	N. W.	5.64	7	15	11
April	30.56	29.56	30.11	64	39	48	63	W.	2.67	2	11	5
May	30.32	29.72	30.01	83	41	58	75	S.	4.67	1	21	16
June	30.24	29.68	29.93	96	52	71	70	S.	1.65	1	7	4
For the year.			30.046			51.1	69.9	W., N. W.	45.64	38	144	108

* Including melted snow.

STATION, NEWARK, N. J.

Latitude, 40° 44' N.; Longitude, 74° 10' W. Height of Barometer Cistern
above Sea Level, 53 feet.

OBSERVER, F. W. RICORD.

	BAROMETER. Reduced to 32°.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches). [*]	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1887.												
July	30.200	24.700	29.950	94	66	79.41	.....	S. E., S. W.	7.050	.....	15	16
August	30.280	29.790	29.030	93	83	78.14	.....	N. W., S. W.	5.230	.....	8	17
September	30.450	29.600	30.025	84	42	63.31	.....	N. W., N. E.	7.300	.....	9	13
October	30.480	29.570	30.025	76	30	61.61	.....	N. W., S. W.	3.530	.....	10	20
November	30.740	29.600	30.130	66	25	43.38	.....	N. W., S. W.	3.060	2	8	15
December	30.900	29.810	30.105	67	13	34.92	.....	N. W.	4.630	0	10	27
1888.												
January	30.690	29.470	30.145	64	3.80	24.89	.....	N. W.	5.850	3	11	22
February	30.680	29.670	30.080	63	3.80	30.96	.....	N. W., S. W.	4.290	0	7	16
March	30.540	29.440	29.990	60	4	31.71	.....	N. W.	6.080	0	8	14
April	30.530	29.610	30.070	85	30	67.93	.....	N. W., S. W.	4.050	3	6	16
May	30.330	29.770	30.050	83	60	69.72	.....	N. E., S. E.	6.330	.....	10	25
June	30.340	29.730	29.965	96	53	72.80	.....	N. E., N. W.	3.700	.....	8	10
For the year	.....	.....	30.047	.....	.....	61.60	.....	N. W., S. W.	51.810	29	110	299

* Including melted snow.

STATION, NEW BRUNSWICK, N. J.

Latitude, 40° 29' N.; Longitude, 74° 27' W. Height of Barometer Cistern
above Sea Level, 115 feet.

OBSERVER, PROF. GEO. H. COOK.

	BAROMETER. Reduced to 32°.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches). [*]	Snow (days of)	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1887.												
July	30.110	24.8	29.950	96.8	62.8	77.7	.....	.....	5.35	.....	15	.....
August	30.110	29.0	29.050	90.0	49.0	69.9	.....	.....	6.24	.....	7	.....
September	30.200	29.0	29.100	86.0	37.5	61.0	.....	.....	3.06	.....	7	.....
October	30.200	29.0	29.100	79.0	27.0	52.6	.....	.....	2.67	.....	8	.....
November	30.200	29.0	29.100	71.7	21.0	42.6	.....	.....	2.21	.....	6	.....
December	30.200	29.0	29.100	58.0	11.0	33.5	.....	.....	.....	.....	10	12
1888.												
January	30.200	29.0	29.100	66.0	-2.5	24.6	.....	.....	4.96	.....	2	13
February	30.200	29.0	29.100	66.0	0.5	29.0	.....	.....	3.63	.....	7	7
March	30.200	29.0	29.100	61.0	4.0	32.0	.....	.....	5.36	.....	8	10
April	30.200	29.0	29.100	87.0	26.5	47.7	.....	.....	3.89	.....	9	6
May	30.200	29.0	29.100	83.0	34.6	58.9	.....	.....	4.89	.....	16	20
June	30.200	29.0	29.100	93.0	46.0	70.2	.....	.....	5.34	.....	7	6
For the year	.....	.....	.....	.....	.....	49.9	.....	.....	51.82	.....	105	64

* Including melted snow.

REPORT ON VITAL STATISTICS.

STATION, BEVERLY, N. J.

Latitude, 40° 4' N.; Longitude, 74° 55' W. Height of Barometer Cistern
above Sea Level, 40 feet.

OBSERVER, C. F. RICHARDSON.

	ANEROID BAROMETER.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches). ^a	Snow (inches). ^a	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1887.												
July	30.53	30.08	30.30	97	69	76.13	80.1	S. W.	9.45	.....	15	12
August	30.49	30.04	30.23	88	65	71.31	79.0	N. W.	3.86	.....	8	13
September	30.59	29.95	30.30	86	38	63.57	77.2	N. E.	5.27	.....	8	14
October	30.59	29.74	30.19	81	26	63.12	73.7	N. W.	2.42	.....	8	15
November	30.64	29.59	30.15	70	23	41.44	74.5	N. W.	1.66	.....	6	17
December	30.73	29.46	30.15	59	12	23.83	81.2	N. W.	5.01	.....	11	16
1888.												
January	30.66	29.66	30.18	69	5	26.09	78.8	N. W.	4.69	.....	11	13
February	30.45	29.74	30.16	68	2	31.66	79.6	N. W.	2.55	.....	12	13
March	30.54	29.59	30.11	69	7	23.87	76.4	N. W.	5.15	.....	11	16
April	30.70	29.76	30.25	68	30	45.96	63.4	N. W.	1.89	.....	7	5
May	30.46	29.94	30.20	67	34	59.96	77.2	N. W.	3.16	.....	13	20
June	30.51	29.95	30.23	99	45	71.09	78.2	N. W.	2.09	.....	6	7
For the year.			30.24			51.00	76.1	N. W.	47.32	15	132	180

^a Including melted snow.

REMARKS.—First frost, September 17th, 1887; last frost, April 25th, 1888. One inch of snow April 16th.

STATION, PHILADELPHIA, PA.

Latitude, 39° 57' N.; Longitude, 75° 9' W. Height of Barometer Cistern
above Sea Level, 117 feet.

OBSERVER, U. S. SIGNAL SERVICE.

	BAROMETER. Reduced to 32°.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches). ^a	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1887.												
July	30.09	29.57	29.87	99.9	67.8	79.7	71.3	S.	7.14	.....	11	11
August	30.19	29.63	29.89	99.1	56.3	73.0	68.9	N.	2.31	.....	8	9
September	30.35	29.49	30.06	85.7	42.4	64.0	69.7	N.	4.91	.....	12	12
October	30.38	29.41	29.93	84.3	39.6	55.6	66.3	W.	1.68	.....	9	13
November	30.70	29.34	29.99	69.6	25.0	45.3	62.4	W.	1.33	.....	7	8
December	30.81	29.23	30.02	68.9	14.5	36.9	71.4	N. W.	0.06	.....	11	11
1888.												
January	30.70	29.49	30.07	56.2	2.4	23.0	71.4	N. W.	4.30	.....	8	14
February	30.55	29.37	29.99	55.5	2.5	34.1	70.0	N. W.	2.57	.....	8	12
March	30.44	29.34	29.95	70.0	8.2	35.1	67.1	N. W.	5.43	.....	7	14
April	30.47	29.45	30.01	90.7	31.0	60.7	63.1	N. W.	2.10	.....	1	6
May	30.18	29.59	29.89	86.6	43.5	60.6	70.4	N. W.	3.46	.....	19	16
June	30.13	29.60	30.00	97.2	52.3	72.6	63.1	S.	1.09	.....	6	5
For the year.			29.93			62.9	67.1	N. W.	41.43	29	120	138

^a Including melted snow.

STATION, VINELAND, N. J.

Latitude, $39^{\circ} 29' N.$; Longitude, $75^{\circ} 1' W.$ Height of Barometer Cistern above Sea Level, 110 feet.

OBSERVER, O. H. ADAMS, M.D.

	BAROMETER. Reduced to 32°.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches). ^a	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1887.												
July	30.087	29.533	29.817	87	64	75.69	81.47	S. W.	2.708		4	6
August	30.079	29.651	29.873	86	59	74.30	80.29	N. E., S. W.	2.514		4	8
September	30.308	29.586	29.981	82	60	61.81	77.93	N. E., S. W.	5.196		4	8
October	30.326	29.341	29.857	80	30	55.28	79.53	S. W., N. E.	2.423		6	8
November	30.075	29.461	29.998	65	18	43.25	77.39	S. W.	2.026		7	8
December	30.761	29.236	30.048	60	15	37.36	79.29	W., N. W.	4.813	3	7	8
1888.												
January	30.637	29.327	30.132	54	3	30.43	78.36	N. W., S. W.	4.486	3	6	6
February	30.509	29.410	30.014	59	5	37.01	79.29	N. W., N. E.	3.917	3	6	9
March	30.411	29.573	30.017	66	5	40.97	77.16	N. W.	7.414		9	10
April	30.366	29.507	30.075	64	36	51.73	72.09	N. W., N. E.	2.661		7	5
May	30.123	29.645	29.812	63	37	60.60	77.56	N. E., S. W.	2.073		8	9
June	30.141	29.643	29.890	63	48	76.40	76.84	N. W.	1.190		3	3
For the year.	30.761	29.532	29.933			52.53	78.1	N. W.	49.313	7	20	58

^a Including melted snow.

STATION, ATLANTIC CITY, N. J.

Latitude, $39^{\circ} 22' N.$; Longitude, $74^{\circ} 25' W.$ Height of Barometer Cistern above Sea Level, 84 feet.

OBSERVER, U. S. SIGNAL SERVICE.

	BAROMETER. Reduced to 32°.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches). ^a	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1887.												
July	30.31	29.66	30.00	97	86	75.3	67	S. E.	1.95		6	8
August	30.36	29.73	30.07	88	64	71.3	64	E.	2.06		15	8
September	30.43	29.63	30.10	78	40	68.4	67	N. E.	8.13		13	7
October	30.48	29.00	30.01	77	34	58.6	90	E., N. E.	3.39		11	14
November	30.73	29.44	30.06	64	28	44.9	80	N.	3.56		8	6
December	30.66	29.18	30.10	56	14	36.7	63	W.	4.51		14	7
1888.												
January	30.80	29.56	30.16	53	25	36.3	78	N. W.	3.96		13	6
February	30.63	29.43	30.07	56	27	33.3	80	N. W.	3.81		11	8
March	30.58	29.36	30.03	70	10	32.8	81	N. W.	4.16		13	7
April	30.54	29.54	30.10	74	30	43.9	74	S.	2.94		8	2
May	30.26	29.68	29.97	74	40	55.1	68	S.	4.02		13	7
June	30.22	29.67	29.91	90	56	66.6	76	S.	3.23		0	1
For the year.			30.088			50.6	82	N. W., S. W.	39.84		123	71

^a Including melted snow.

METEOROLOGICAL SUMMARY FOR THE STATE.

July, 1887.

The month of July has surpassed all others for many years and will long be remembered for its excessive heat and humidity and its violent storms. Nearly every day for weeks the local papers have been telling of severe storms. The largest rainfall reported for the month was 15.29 inches, at Hightstown. On the 22d, 5.40 inches fell at Matawan, causing damage to the amount of \$10,000. At Phillipsburg, Warren county, on the night of the 23d, a very severe thunder storm occurred. The lightning struck a smoke-stack on the Delaware Rolling Mill, and it fell against another high stack and both crushed in the roof over the hot furnace. A heavy shaft in the mill was also cut in two by the lightning. The Judd carriage-factory, near by, was completely demolished. Hamlin's barn was blown over and four horses were buried in the ruins. A car loaded with ice, on the Lehigh Valley railroad, was blown down an embankment, and several houses in different parts of Phillipsburg were unroofed and many trees were uprooted. The damage, so far as known, will not be less than \$20,000.

THE MEAN TEMPERATURE at ten stations, as compared with normals determined from past records of New York city, Atlantic City, Paterson, Newark, South Orange, Somerville, Moorestown, Philadelphia, Lambertville and New Brunswick, shows an excess of heat received during July of 3.3 degrees.

OPTICAL PHENOMENA.—*Auroras*: dates observed—Clayton, 20th; Moorestown, 18th; Egg Harbor City, 12th and 19th. *Lunar Halos*—Clayton, 24th and 30th; Beverly, 4th; Somerville, 7th, 8th, 27th and 28th; Locktown, 28th; New York city, 4th; Egg Harbor City, 25th and 29th. *Solar Halos*—Clayton, 24th; Beverly, 24th; Union, 9th; Paterson, 9th; Oceanic, 25th. *Meteors*—Beverly, 1st, 9th and 25th; Clayton, 7th.

August, 1887.

TEMPERATURE.—The mean temperature as compared with normals determined from past records of New Germantown, Newark, New Brunswick, Princeton, Lambertville, Trenton, Morrisville, Sandy Hook, Barnegat, Atlantic City, Freehold, Moorestown, Vineland, Greenwich and Cape May, shows a deficiency of heat received during the month of August of 1.26 degrees. The maximum recorded during the month was 94 degrees at Salem, on the 6th, and the minimum 42 degrees at Hanover, on the 27th. Fourteen stations report a maximum above 90 degrees and eleven report a minimum below 50 degrees.

RAINFALL.—The rainfall for the month was generally below the average. The heaviest rainfalls reported were as follows: New Brunswick, 4.62 inches; 4.50 inches of which fell between 1:58 and 3:15 P. M. of the 2d. At South Orange, on the 22d, 4.0 inches fell between 5 A. M. and 5 P. M. On the same date 2.12 inches were reported from Tenaflly, 1.91 inches at Rancoeas, 1.46 inches at Union, 1.24 inches at Philadelphia, 1.41 inches at New York city, 1.66 inches at Hightstown, 1.68 inches at Clayton, 1.13 inches at Beverly

and 1.02 inches at Imlaystown. The storm on the 2d was confined to the counties of Middlesex and Morris.

OPTICAL PHENOMENA.—*Auroras*: dates observed—Egg Harbor City, 13th and 16th. *Solar Halos*—Egg Harbor City, 7th, 9th, 12th, 13th, 18th and 19th; Union, 7th and 23d. *Meteors*—Dover, 8th, 9th and 12th; Beverly, 11th, 12th, 25th and 31st; Clayton, 12th. *Hail Storms*—Readington, 23d; Somerville, 22d; Beverly, 20th. *Polar Bands*—Beverly, 13th. *Light Frost*—Tenaflly (lowlands), 26th; Beverly, 27th.

THUNDER STORMS.—Thunder storms were noted during the month of August as follows: Atlantic City, 1st, 6th, 11th, 12th, 20th, 22d and 30th; Beverly, 1st, 2d, 3d, 5th, 6th, 11th, 12th, 20th, 22d, 23d and 24th; Billingsport Light House, 6th and 24th; Bordentown, 11th, 20th, 22d and 24th; Clayton, 1st, 6th, 11th, 20th, 22d and 24th; Dover, 1st, 2d, 6th, 11th, 19th, 22d, 23d and 24th; Egg Harbor City, 6th, 20th and 24th; Harrisville, 1st, 6th, 11th, 15th, 20th, 22d, 23d, 24th, 30th and 31st; Hightstown, 11th, 22d, 23d and 24th; Imlaystown, 6th, 12th and 20th; Lambertville, 6th, 11th, 22d, 23d and 24th; Locktown, 6th, 11th, 22d, 23d and 24th; New York, 6th, 11th, 22d and 24th; Ocean City, 6th and 30th; Oceanic, 2d, 5th, 6th, 15th, 20th, 22d, 23d and 24th; Philadelphia, 6th, 11th, 20th, 22d and 24th; Rancocas, 6th, 11th, 22d, 23d and 24th; Readington, 6th, 11th, 22d, 23d and 24th; Salem, 6th, 22d and 23d; Somerville, 1st, 2d, 5th, 6th, 11th, 15th, 18th, 22d, 23d and 24th; South Orange, 2d, 11th, 19th, 22d, 23d and 24th; Tenaflly, 1st, 2d, 3d, 12th and 21st; Union, 6th, 11th, 22d, and 24th (2); Moorestown, 1st, 2d, 6th, 11th, 18th, 19th, 20th, 21st, 22d, 23d and 24th.

September, 1887.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.20; maximum observed, 30.63, at Egg Harbor City, on the 18th; minimum, 29.57, at Dover, on the 7th; range for State, 1.06; greatest local range, 0.24, at Dover, on the 6th; least local range, .00, at Egg Harbor, on the 11th.

TEMPERATURE (degrees F.).—Monthly mean, 61.6 degrees; highest monthly mean, 67.1 degrees, at Ocean City; lowest monthly mean, 57.8 degrees, at Locktown; maximum, 92.0 at Oceanic, on the 4th; minimum, 80.0 degrees, at Tenaflly, on the 27th; range for State, 62.0 degrees; greatest local monthly range, 55.0 degrees, at Tenaflly; least local monthly range, 37.9 degrees, at Atlantic City; greatest daily range, 41.0, at Tenaflly, on the 9th, 18th, 19th; least daily range, 1.0, at Bordentown, on the 30th.

PRECIPITATION—including melted snow (in inches).—Average for the State, 3.66; greatest, 6.25, at Rancocas; least, 1.62, at Gillette. *Wind*—Prevailing direction, northwest. *Thunder Storms*—7th, 12th and 30th. *Frost*—17th, 18th, 25th, 26th, 27th and 29th. *Solar Halos*—2d, 6th, 7th, 9th, 11th and 27th. *Lunar Halos*—4th, 9th, 26th and 27th. *Meteors*—17th, 18th, 19th, 21st, 25th and 26th. *Auroras*—9th and 18th.

TEMPERATURE.—The temperature for the month as compared with normals determined from past records of New Germantown, New Brunswick, Princeton, Lambertville, Trenton, Sandy Hook, Barnegat, Atlantic City, Freehold, Moorestown, Vineland, Greenwich and Cape May, shows a defi-

ciency of heat received during the month of September of 4.6 degrees. The maximum recorded during the month was 92 degrees, at Oceanic, Monmouth county, on the 4th, and the minimum, 80 degrees, at Tenafly, Bergen county, on the 27th.

PRECIPITATION.—The rainfall for the month is generally below the average. The greatest monthly rainfalls reported were as follows: Rancocas, Burlington county, 6.25 inches; Imlaystown, Monmouth county, 5.92 inches; Toms River, Ocean county, 5.93 inches, and Egg Harbor, Atlantic county, 5.70 inches. The least monthly rainfalls (less than 2 inches) were reported from the counties of Essex and Morris.

October, 1887.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.20; maximum observed, 30.65, at Egg Harbor City, on the 16th; minimum observed, 29.49, at Dover, on the 21st; range for State, 1.16; greatest local range, 0.82, at Beverly, on the 11th; least local range, 0.1, at Beverly, on the 2d.

TEMPERATURE.—Monthly mean, 52.8 degrees; highest monthly mean, 58.9 degrees, at Ocean City; lowest monthly mean, 46.5 degrees, at Rancocas; maximum, 89.0, at Clayton, on the 8th; minimum, 21.0 degrees, at Hanover, on the 31st; range for State, 68.0 degrees; greatest local monthly range, 63.2 degrees, at Egg Harbor City; least local monthly range, 3.8 degrees, at Ocean City; greatest daily range, 44.0, at Locktown, on the 18th; least daily range, 5.0, on the 28th.

PRECIPITATION—including melted snow (in inches).—Average for the State, 2.61; greatest, 5.0, at Ocean City; least, 1.58, at Princeton. *Wind*—Prevailing direction, northwest. *Polar Bands*—5th. *Hail*—25th. *Frost*—6th, 12th, 13th, 14th, 15th, 16th, 17th, 20th, 22d, 23d, 26th and 31st. *Solar Halos*—23d. *Lunar Halos*—23d, 25th, 28th, 29th and 30th. *Meteors*—6th, 7th, 13th, 15th and 17th.

TEMPERATURE.—The mean temperature for the month, as compared with normals determined from past records of Paterson, Newark, South Orange, New Germantown, Somerville, Princeton, Lambertville, Atlantic City, Moorestown and New Brunswick, shows a deficiency of heat received during the month of October of 0.8 degrees. The maximum recorded during the month was 89 degrees, at Clayton, Gloucester county, on the 8th, and the minimum 21 degrees, at Hanover, on the 31st.

PRECIPITATION.—The average rainfall for New Jersey for the month of October, 1887, 2.61 inches, was 1.10 inches below the October normal for many years. The greatest total monthly rainfall reported was 5.0 inches, from Ocean City, Cape May county, and the least monthly total, 1.58, from Princeton, Mercer county.

November, 1887.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.125; maximum observed, 30.960, at Egg Harbor City, on the 30th. Minimum observed, 29.460, at Atlantic City, on the 19th. Range for State, 1.500; greatest local

range, .502, at Dover, on the 10th; least local range, .02, at Lakewood, on the 18th and 24th.

TEMPERATURE (degrees F. 1).—Monthly mean, 41.5; highest monthly mean, 46.5, at Ocean City; lowest monthly mean, 38.3, at Dover; maximum, 72.0, at Harrisville and New Brunswick, on the 4th and 27th; minimum, 12.0, at Imlaystown, on the 30th. Range for State, 60.0; greatest local monthly range, 58.0, at Imlaystown; least local monthly range, 40.0, at Atlantic City; greatest daily range, 41.0, at Elizabeth, on the 5th; least daily range, 2.2, on the 20th, at Egg Harbor City.

PRECIPITATION—including melted snow (in inches).—Average for the State, 1.943; greatest, 2.60, at Egg Harbor City; least, 0.95, at Gillette. *Wind*—Prevailing direction, northwest. *Thunder Storms*—Distant lightning, 14th and 19th. *Hail*—1st and 11th. *Sleet*—1st and 11th. *Snow*—11th; (first of the season). *Frost*—1st, 2d, 3d, 4th, 6th, 9th, 11th, 14th, 16th, 18th, 21st, 22d, 23d, 29th and 30th. *Solar Halos*—4th, 7th, 14th and 18th. *Lunar Halos*—1st, 24th, 25th and 26th. *Meteors*—6th, 7th (3), 12th, 16th, 17th and 20th. *Auroras*—12th, at Oceanic.

December, 1887.

TEMPERATURE (degrees F.)—Monthly mean, 33.7; highest monthly mean, 38.5, at Ocean City; lowest monthly mean, 30.8, at Hanover; maximum, 63.0, at Ocean City, on the 4th; minimum, 6.0, at Hanover, on the 1st; range for State, 57.0; greatest local monthly range, 53.0, at Hanover; least local monthly range, 41.5, at Atlantic City; greatest daily range, 35.0, at Hanover, on the 28th; least daily range, 2.0, on the 15th, at Newark.

PRECIPITATION—including melted snow (in inches).—Average for the State, 5.29; greatest, 7.32, at Lambertville; least, 3.64, at Union. *Wind*—Prevailing direction, northwest. *Destructive Storms*—28th, near Oceanic, Monmouth county. *Sleet*—17th, 20th, 28th and 31st. *Snow*—1st, 2d, 18th, 20th, 24th, 26th, 28th and 31st. *Lunar Halos*—23d, 25th, 27th and 30th. *Meteors*—4th, 5th, 6th and 21st. *Auroras*—29th.

NOTE—The mean temperature, 33.7 degrees, is 1.1 degree above the December normal. The average precipitation, 5.29 inches, is 2.61 inches above the December average for the State.

January, 1888.

TEMPERATURE (degrees F.)—Monthly mean, 25.4; highest monthly mean, 29.2, at Ocean City; lowest monthly mean, 21.0, at Hanover; maximum, 59.0, at Freehold, on 2d and 15th; minimum, 12 below zero, at Tenaflly, on the 23d; range for State, 71.0; greatest local monthly range, 67.0, at Tenaflly; least local monthly range, 46.0, at Locktown; greatest daily range, 41.0, at Freehold, on the 16th; least daily range, 2.0, on the 3d, at Paterson and Oceanic.

PRECIPITATION—including melted snow (in inches).—Average for the State, 4.77; greatest, 6.74, at Paterson; least, 2.80, at Salem. *Wind*—Prevailing direction, northwest. *Hail*—Dates observed, 17th and 25th. *Sleet*—1st, 5th, 6th, 10th, 13th, 17th and 25th. *Snow*—3d, 4th, 9th, 13th, 15th, 17th, 18th,

20th, 21st, 23d, 25th, 26th, 27th and 31st. *Solar Halos*—23d and 25th. *Lunar Halos*—3d, 19th, 24th and 29th. *Auroras*—12th, 18th and 16th. *Meteor* observed—26th.

February, 1888.

TEMPERATURE (degrees F.)—Monthly mean, 30.6; highest monthly mean, 34.0, at Ocean City; lowest monthly mean, 27.1, at Hanover; maximum, 60.0, at Trenton, on the 20th; minimum, 5.0 below zero, at Tenaflly, on the 16th; range for the State, 65.0; greatest local monthly range, 59.0, at Tenaflly; least local monthly range, 48.0, at South Orange; greatest daily range, 48.0, at Tenaflly, on the 2d; least daily range, 3.0, at Newark, Beverly and Clayton, on the 6th, 7th and 12th, respectively.

PRECIPITATION—including melted snow (in inches).—Average for the State, 3.53; greatest, 6.01, at Tenaflly; least, 2.04, at Toms River. *Humidity*—Mean relative humidity, for the State, 76.5 per cent. *Wind*—Prevailing direction, northwest. *Thunder Storms*—At nearly all stations on the 20th.

MISCELLANEOUS PHENOMENA—dates observed.—*Hail*—11th and 18th. *Sleet*—4th, 7th, 10th, 11th, 12th and 18th. *Snow*—7th, 10th, 12th, 18th, 27th and 28th. *Solar Halos*—9th, 14th, 17th, 19th, 21st, 23d and 24th. *Lunar Halos*—3d, 19th, 21st, 22d and 24th. *Meteors*—14th and 22d. *Polar Bands*—3d, 9th, 21st and 28th. *Auroras*—9th.

March, 1888.

TEMPERATURE (degrees F.)—The average temperature for the month, 32.8, is 0.8 below the average for the corresponding month of 1887, and 4.2 below the normal of a great number of years. At Newark, the record makes the mean temperature of March for the last forty-four years, 37.4, which shows a deficiency of 4.7; highest monthly mean, 35.9, at Salem; lowest monthly mean, 30.2, at Union; maximum, 72.0, at Readington, on the 31st; minimum, 4.0 below zero, at Paterson, on the 13th; range for the State, 76.0; greatest local monthly range, 66.0, at Readington; least local monthly range, 56.0, at Newark; greatest daily range, 42.0, at Gillette, on the 20th; least daily range, 1.0, at Hanover, on the 16th; mean relative humidity, 79.8.

PRECIPITATION—including melted snow (in inches).—Average for the State, 5.71; greatest, 8.22, at Trenton; least, 3.75, at Salem. *Wind*—Prevailing direction of wind, northwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—11th, 20th and 21st. *Hail*—12th, 21st and 25th. *Sleet*—1st, 2d, 4th, 11th, 24th and 25th. *Solar Halos*—10th, 16th, 17th and 18th. *Lunar Halos*—17th, 19th, 20th, 22d and 23d. *Meteors*—6th. *Polar Bands*—17th, 19th and 24th. *Auroras*—7th and 10th, Egg Harbor City.

April, 1888.

The mean temperature of the State for the month, determined from past records of twenty-nine stations, was found to be five-tenths of a degree above the mean. It was below the average until the 26th, when it rose at once to

summer heat. On the 29th and 30th, several stations recorded 90, 91, 91.5 and 92 degrees respectively, which is the highest recorded, according to Mr. P. V. Spader's records, since April, 1861. The average rainfall for the State, 3.28 inches, shows a deficiency for the month of 0.65 inches.

TEMPERATURE (degrees F.)—Monthly mean, 47.9; highest monthly mean, 51.8, at Bridgeton; lowest monthly mean, 44.8, at Hanover; maximum, 92.0, at Tenaflly, on the 29th; minimum, 22.0, at Tenaflly, on the 25th; range for State, 70.0; greatest local monthly range, 70.0, at Tenaflly; least local monthly range, 38.0, at Ocean City; greatest daily range, 47.0, at Tenaflly and Bordentown, on the 28th; least daily range, 3.0, at Paterson, on the 18th.

PRECIPITATION—including melted snow (in inches).—Average for the State, 3.28; greatest, 4.68, at New Brunswick; least, 1.89, at Beverly.

Wind—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—5th, 6th and 18th. *Hail*—1st, 12th, 16th and 21st. *Sleet*—1st, 12th and 21st. *Snow*—16th and 21st. *Frost*—4th, 8th, 9th, 13th, 17th, 21st, 22d, 24th and 25th. *Solar Halos*—6th, 17th, 19th and 24th. *Lunar Halos*—15th, 17th, 22d and 23d. *Meteors*—26th. *Auroras*—11th, Princeton; 12th, Beverly.

May, 1888.

The extraordinary character of the month is shown by its record of cloudy and rainy days, and also in the comparative table of precipitation. It was a phenomenal month, and will hold a prominent place in the meteorological records of the State for years to come. The agriculturalist, too, will also have cause to remember it; it was so disastrous to the crops, especially to cherries, plums and peaches.

TEMPERATURE (degrees F.)—Monthly mean, 52.4; highest monthly mean, 63.0, at Bridgeton; lowest monthly mean, 55.1, at Atlantic City; maximum, 91.0, at Oceanic, on the 29th; minimum, 26.0, at Hanover, on the 3d; range for State, 65.0; greatest local monthly range, 59.0, at Locktown; least local monthly range, 30.0, at Ocean City; greatest daily range, 47.0, at Bordentown, on the 5th; least daily range, 2.0, at Oceanic, on the 23d.

PRECIPITATION—including melted snow (in inches).—Average for the State, 4.92; greatest, 6.48, at Egg Harbor City; least, 3.0, at Locktown.

Wind—Prevailing direction, east.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—5th, 9th, 10th, 11th, 12th, 14th, 16th, 28th, 29th and 30th. *Hail*—18th and 29th, at Union and Beverly, respectively. *Frost*—2d, 3d, 4th, 5th, 17th and 21st. *Polar Bands*—17th, at Beverly. *Solar Halos*—10th, 20th, 21st, 22d and 23d. *Lunar Halos*—17th, 19th, 21st, 22d and 23d. *Auroras*—2d and 20th.

June, 1888.

TEMPERATURE.—The mean temperature of the State, as compared with normals determined from past records of twenty-nine stations, was found to be one and one-tenth degrees above the mean. The maximum, 104 degrees, is probably the highest temperature recorded within the State

during the month of June. Temperatures ranging from 94 to 104 degrees were recorded between the 21st and 25th, at all stations.

PRECIPITATION.—The average rainfall for the month, for the State, 2.59 inches, is 1.02 below the average, as determined from past records of twenty-nine stations. Seven stations report an excess, and twenty-two a deficiency. Two stations, Trenton and Toms River, report a total exceeding five inches, and five stations report a total of less than two inches.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 29.940; maximum observed, 30.257, at Highland Park, on the 13th; minimum observed, 29.700, at Atlantic City, on the 1st; range for State, 0.557.

TEMPERATURE (degrees F.)—Monthly mean, 70.8; highest monthly mean, 75.0, at Bridgeton and Trenton; lowest monthly mean, 66.6, at Atlantic City; maximum, 104.0, at Tenaflly, on the 23d; minimum, 38.0, at Bordentown, on the 5th; range for State, 66.0; greatest local monthly range, 6.40, at Tenaflly; least local monthly range, 40.5, at Atlantic City; greatest daily range, 45.0, at Bordentown, on the 5th; least daily range, 1.0, at Paterson, on the 28th.

PRECIPITATION—including melted snow (in inches).—Average for the State, 2.59; greatest, 5.69, at Trenton; least, 1.67, at Bridgeton. *Wind*—Prevailing direction, southwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—6th, 10th, 14th, 15th, 16th, 17th, 18th, 21st, 23d, 24th, 25th, 26th, 27th, 28th, 29th and 30th. *Hail*—15th, 16th and 23d. *Solar Halos*—12th, 13th, 14th, 21st, 22d and 27th. *Lunar Halos*—19th and 21st. *Meteors*—12th and 19th. *Auroras*—2d, 3d and 5th. *Polar Bands*—17th, 19th and 30th.

DIVORCES IN NEW JERSEY FOR TEN YEARS.

In our first quinquennial report of vital statistics (see seventh report, 1883, of State Board of Health,) we gave a list of all the divorces of the previous five years, with specification of causes and the number, as granted by counties, together with the proportion they bore to the marriages. We also presented the facts as to the relation which these bear to vital statistics, and to the sanitary, social and moral interests of society. We refer to the article on this subject in that report, pages 325-329, for various facts and arguments, all of which cannot be repeated here. The alarming extent to which divorces had increased in some of the States has since led to a thorough investigation of the subject and to various discussions and legal provisions, with the view of limiting this tendency.

In Pennsylvania there had been, in one year, an average of one divorce to every ten marriages, and the same in Connecticut. Maine, Vermont, Rhode Island and Indiana approximated to the same proportions.

Dr. Woolsey, of New Haven, in a series of very able articles, brought his knowledge of international and national law to bear on the subject, and presented facts as to the bearing of this demoralization of the family relation upon the interests of the State and the nation, as well as upon general morality, so as to arouse the attention of statisticians and legislators.

Rev. Mr. Dike, now of Massachusetts, did similar service by extended correspondence and the facts which he elicited. He and others succeeded in forming an anti-divorce league, which pressed the matter upon the legislators of the afflicted States until some radical reforms have been made.

Fortunately, our own State had not fallen into the legal laxity of some of the surrounding States, which had made intemperance, cruelty, and almost any misconduct which "defeats the purposes of the marriage relation," a ground of application for divorce. With our courts,

the testimony is taken before a Master in Chancery, and the Court of Chancery thoroughly scrutinizes the facts in evidence. No attempt is made to favor such privacy as will encourage application. Still, there is some need of guard in this State. The right to perform the marriage ceremony should not be given to too many classes of officers. Where neither party is known to the person performing the ceremony, and there is reasonable doubt as to age, the oath of the party or parties should not be sufficient, but should be attested by some friend accompanying. At any rate, all should be impressed with the fact that hasty and too youthful marriages always mean multiplication of divorces, and the divorces mean disrupted families and untrained children, too often becoming the dependents of the State.

There are good grounds for contending that we should have a national divorce law, since a marriage is often legal in one State that is not in another. So, as to divorce, we have all varieties of grounds, from that of "incompatibility and mutual diversion," in Illinois, to absolute prohibition in South Carolina, except by statute.

In this report we give the two quinquennial lists of divorces and then the combined decennial report, and compare it with the number of marriages which have taken place.

NUMBER OF DIVORCES GRANTED IN THE STATE OF NEW JERSEY, FOR A PERIOD OF FIVE YEARS, FROM JULY 1ST, 1878, TO JULY 1ST, 1883, IN YEARLY GROUPS.

YEAR.	Number Granted.	APPLICANTS.		CAUSES					
		Husband.	Wife.	Adultery.	Desertion.	Extreme Cruelty.	Bigamy.	Impotence.	Near Relation.
1878-79...	144	59	85	60	78	3	1	2	..
1879-80...	149	51	98	56	86	6	..	1	..
1880-81...	137	50	87	52	79	2	2	1	1*
1881-82...	175	58	117	63	103	5	4	..	..
1882-83...	183	56	127	56	115	7	4	1	..
Totals...	788	274	514	287	461	23	11	5	1

* Married mother-in-law.

DIVORCES IN NEW JERSEY FOR TEN YEARS. 435

NUMBER OF DIVORCES GRANTED BY COUNTIES.

COUNTIES.	1878-79.	1879-80.	1880-81.	1881-82	1882-83.	Totals.	Population, Census of 1880.
Atlantic.....	...	1	1	4	6	12	18,704
Bergen.....	4	3	4	5	7	23	36,786
Burlington.....	5	7	5	5	7	29	55,403
Camden.....	9	6	7	7	11	40	62,942
Cape May.....	1	...	1	...	2	4	9,765
Cumberland...	7	5	1	6	3	22	37,687
Essex.....	33	38	41	44	43	199	189,929
Gloucester.....	1	2	2	1	4	10	25,886
Hudson.....	28	30	17	34	35	144	187,944
Hunterdon.....	2	3	2	2	4	13	38,570
Mercer.....	9	6	6	17	10	48	58,061
Middlesex.....	9	6	5	3	8	31	58,286
Monmouth.....	5	7	10	5	6	33	55,538
Morris.....	4	2	5	4	4	19	50,861
Ocean.....	1	1	2	3	2	9	14,455
Passaic... ..	9	14	14	16	12	65	68,860
Salem.....	1	...	1	...	4	6	24,579
Somerset.....	2	4	...	2	4	12	27,162
Sussex.....	1	1	1	2	1	6	23,539
Union.....	10	6	7	6	3	32	55,571
Warren.....	3	4	1	3	3	14	36,589
Out of State...	...	3	4	6	4	17	.....
Totals.....	144	149	137	175	183	788	1,131,117

SUMMARY OF MARRIAGES FOR FIVE YEARS, FROM JULY 1ST, 1878, TO JULY 1ST, 1883.

YEAR.	Marriages.	Supplement of each year.
1878-79.....	7,188	171
1879-80.....	7,935	227
1880-81.....	8,109	257
1881-82.....	8,837	745
1882-83.....	9,116	.....
	41,185	1,400
	1,400	
Total.....	42,585	

This gives a divorce-rate of 18.50 per 1,000 marriages, or 2,000 persons ; or one divorce to every $54\frac{1}{4}$ marriages.

REPORT ON VITAL STATISTICS.

NUMBER OF DIVORCES GRANTED IN THE STATE OF NEW JERSEY, FOR A PERIOD OF FIVE YEARS, FROM JULY 1ST, 1883, TO JULY 1ST, 1888, IN YEARLY GROUPS.

YEAR.	Number Granted.	APPLICANTS.		CAUSES.					
		Husband.	Wife.	Adultery.	Desertion.	Extreme Cruelty.	Bigamy.	Impotence.	Near Relations.
1883-84...	220	80	140	81	130	5	3	■	...
1884-85...	213	73	140	81	122	8	2	...	...
1885-86...	231	93	■	79	143	5	4	...	...
1886-87...	240	84	156	86	142	7	5	...	...
1887-88...	269	99	170	95	161	9	■	1	...
Totals...	1,173	429	744	422	698	34	17	2	...

NUMBER OF DIVORCES GRANTED BY COUNTIES.

COUNTIES.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	Totals.	Population, Census of 1885.
Atlantic.....	2	4	4	5	■	19	22,356
Bergen.....	6	5	7	1	9	28	39,880
Burlington.....	6	8	4	7	12	37	57,558
Camden.....	19	13	24	20	29	105	76,685
Cape May.....	...	1	...	1	...	2	10,744
Cumberland...	9	8	12	5	11	45	41,982
Essex.....	■	43	52	43	49	241	213,764
Gloucester.....	■	4	4	1	5	11	27,603
Hudson.....	42	34	43	57	43	219	240,342
Hunterdon.....	2	3	4	9	1	19	37,420
Mercer.....	12	18	20	23	29	102	66,785
Middlesex.....	7	7	7	7	5	33	56,180
Monmouth.....	9	11	8	14	14	56	62,324
Morris.....	3	7	7	6	10	33	50,675
Ocean.....	2	2	2	2	1	9	15,586
Passaic.....	23	12	18	17	18	84	83,374
Salem.....	5	3	1	1	2	12	25,373
Somerset.....	4	7	2	6	3	22	27,425
Sussex.....	...	2	4	1	■	11	22,401
Union.....	8	12	3	9	15	47	61,839
Warren.....	4	3	4	■	5	19	37,737
Out of State...	2	4	1	2	3	12	.....
Totals.....	220	213	231	240	269	1,173	1,278,033

DIVORCES IN NEW JERSEY FOR TEN YEARS. 437

SUMMARY OF MARRIAGES FOR FIVE YEARS, FROM JULY 1ST, 1883, TO JULY 1ST, 1888.

YEAR.	Marriages.	Supplement of each year.
1883-84.....	8,968	361
1884-85.....	8,989	359
1885-86.....	9,824	487
1886-87.....	11,567	223
1887-88.....	11,945	.....
	51,293	1,430
	1,430	
Total.....	52,723	

This gives a divorce-rate of 22.25 per 1,000 marriages, or 2,000 persons; or one divorce to every $45\frac{1}{2}$ marriages. Combining this with the table for the five years from July 1st, 1878, to July 1st, 1883, gives a divorce-rate of 20.58 per 1,000 marriages, or 2,000 persons; or one divorce to every $48\frac{3}{4}$ marriages for the ten years from July 1st, 1878, to July 1st, 1888.

NUMBER OF MARRIAGES, BIRTHS AND DEATHS
BY TOWNSHIPS AND COUNTIES, AND
TOTALS FOR THE STATE.

FOR THE YEAR ENDING JUNE 30, 1888.

ATLANTIC COUNTY.

	M.	B.	D.
Absecon.....	1	10	10
Atlantic City	152	199	283
Buena Vista.....	...	18	19
Egg Harbor City.....	28	45	87
Egg Harbor Township.....	22	89	65
Galloway	6	51	34
Hamilton.....	17	81	26
Hammonton.....	19	84	45
Mullica... ..	4	6	14
Weymouth	1	9	9
	245	542	492

BERGEN COUNTY.

	M.	B.	D.
Englewood	85	67	67
Franklin	11	26	19
Harrington	12	83	87
Hoboken	10	39	38
Lodi.	25	96	97
Midland.....	5	17	31
New Barbadoes.....	54	118	102
Orvil.	10	18	32
Palisade.	17	84	28
Ridgefield.....	22	96	91
Ridgewood	11	19	20
Saddle River.....	2	24	26
Union	10	55	73
Washington.....	12	51	37
	286	692	693

BURLINGTON COUNTY.

	M.	B.	D.
Bass River.....	5	18	15
Beverly.....	27	18	54
Bordentown.....	88	102	97
Burlington.....	101	89	165
Chester.....	28	59	52
Chesterfield.....	10	18	22
Cinnaminson ..	28	72	41
Delran.....	6	31	43
Eastampton.....	2	15	6
Evesham.....	8	21	19
Florence.....	8	52	27
Little Egg Harbor.....	9	51	29
Lumberton.....	2	22	19
Mansfield.....	7	84	30
Medford.....	17	25	41
Mount Laurel ..	...	22	11
New Hanover.....	20	50	40
Northampton.....	54	81	135
Pemberton.....	4	26	72
Randolph.....	8	6	7
Shamong.....	...	11	12
Southampton.....	12	42	30
Springfield.....	5	27	26
Washington.....	...	6	10
Westampton.....	...	18	8
Willingboro.....	7	5	8
Woodland.....	1	2	2
	392	918	1,021

CAMDEN COUNTY.

	M.	B.	D.
*Camden City.....	4,936	1,111	1,205
Centre.....	3	60	44
Delaware.....	...	22	9
Gloucester City.....	88	150	138
Gloucester.....	13	70	75
Haddon.....	82	101	63
Stockton.....	35	86	127
Waterford.....	17	53	32
Winslow.....	16	82	34
	5,140	1,685	1,727

CAPE MAY COUNTY.

	M.	B.	D.
Cape May City.....	26	41	32
Dennis.....	11	31	27
Lower.....	10	50	31
Middle.....	11	42	43
Upper.....	17	34	13
	75	198	146

* Marriages of non-residents, 4,080.

CUMBERLAND COUNTY.

	M.	B.	D.
Bridgeton.....	106	246	178
Commercial.....	21	70	18
Deerfield.....	11	34	20
Downe.....	18	33	8
Fairfield.....	8	15	23
Greenwich.....	6	20	14
Hopewell.....	14	30	37
Landis.....	67	152	120
Lawrence.....	18	21	32
Maurice River.....	21	51	37
Millville.....	95	303	191
Stoe Creek.....	1	23	8
	380	998	696

ESSEX COUNTY.

	M.	B.	D.
Belleville.....	27	85	63
Bloomfield.....	42	171	109
Caldwell.....	18	33	50
Clinton.....	10	54	35
East Orange.....	86	179	144
Franklin.....	9	32	37
Livingston.....	7	14	8
Millburn.....	10	43	34
Montclair.....	54	180	114
Newark.....	1,542	4,751	4,133
Orange.....	177	467	373
South Orange.....	25	82	57
West Orange.....	19	64	70
	2,026	6,105	5,227

GLOUCESTER COUNTY.

	M.	B.	D.
Clayton.....	18	41	43
Deptford.....	3	30	24
East Greenwich.....	6	24	25
Franklin.....	5	46	35
Glassboro.....	32	63	47
Greenwich.....	10	31	31
Harrison.....	8	33	25
Logan.....	7	32	19
Mantua.....	10	35	26
Monroe.....	13	13	57
South Harrison.....	1	14	12
Washington.....	8	23	14
West Deptford.....	5	23	20
Woodbury.....	47	92	86
Woolwich.....	13	62	23
	186	577	497

HUDSON COUNTY.

	M.	B.	D.
Bayonne.....	99	287	345
Guttenberg.....	4	59	43
Harrison.....	23	248	194
Hoboken.....	482	1,282	1,061
Jersey City.....	1,289	3,814	3,980
Kearny.....	14	117	74
North Bergen.....	26	88	220
Town of Union.....	161	261	208
Union.....	9	51	55
Weehawken.....	2	26	48
West Hoboken.....	76	270	218
	2,185	5,993	6,446

HUNTERDON COUNTY.

	M.	B.	D.
Alexandria.....	7	18	14
Bethlehem.....	28	88	43
Clinton.....	26	44	34
Delaware.....	32	49	41
East Amwell.....	8	15	32
Franklin.....	11	19	17
Frenchtown.....	29	24	10
High Bridge.....	14	88	28
Holland.....	20	28	81
Kingwood.....	4	28	18
Lambertville.....	56	81	57
Lebanon.....	25	54	25
Raritan.....	35	55	71
Readington.....	19	85	42
Tewksbury.....	14	53	20
Union.....	7	18	11
West Amwell.....	4	12	5
	339	584	494

MERCER COUNTY.

	M.	B.	D.
Chambersburg.....	92	228	169
East Windsor.....	25	60	49
Ewing.....	5	10	97
Hamilton.....	16	28	82
Hopewell.....	45	58	61
Lawrence.....	2	20	18
Millham.....	15	49	65
Princeton.....	29	55	65
Trenton.....	580	622	671
Washington.....	2	18	9
West Windsor.....	9	24	29
	820	1,172	1,315

MIDDLESEX COUNTY.

	M.	B.	D.
Cranbury.....	20	30	27
East Brunswick.....	28	75	57
Madison.....	8	20	21
Monroe.....	20	89	45
New Brunswick.....	125	381	352
North Brunswick.....	11	16	24
Perth Amboy.....	54	145	173
Piscataway.....	15	57	51
Raritan.....	28	56	58
Sayreville.....	14	15	16
South Amboy.....	30	96	76
South Brunswick.....	13	41	46
Woodbridge.....	22	72	50
	873	1,043	991

MONMOUTH COUNTY.

	M.	B.	D.
Atlantic.....	4	13	9
Eatontown.....	16	20	29
Freehold.....	52	77	110
Holmdel.....	9	8	20
Howell.....	35	58	40
Long Branch.....	51	131	103
Manalapan.....	10	22	38
Marlboro.....	8	35	24
Matawan.....	29	50	67
Middletown.....	28	67	102
Millstone.....	6	24	38
Neptune.....	70	106	128
Ocean.....	6	29	42
Raritan.....	29	90	110
Shrewsbury.....	78	113	149
Upper Freehold.....	17	51	50
Wall.....	39	110	82
	487	1,004	1,141

MORRIS COUNTY.

	M.	B.	D.
Boonton.....	17	45	53
Chatham.....	29	63	87
Chester.....	14	48	22
Hanover.....	16	46	115
Jefferson.....	2	22	19
Mendham.....	11	17	27
Montville.....	6	9	19
Morristown.....	51	178	166
Mount Olive.....	12	21	26
Passaic.....	7	11	32
Pequannock.....	16	40	35
Randolph.....	51	125	119
Rockaway.....	41	100	130
Roxbury.....	12	68	86
Washington.....	10	59	25
	296	852	941



NUMBER OF MARRIAGES, BIRTHS AND DEATHS BY TOWNSHIPS AND COUNTIES, AND TOTALS FOR THE STATE.

FOR THE YEAR ENDING JUNE 30, 1888.

ATLANTIC COUNTY.

	M.	B.	D.
Absecon.....	1	10	10
Atlantic City	152	199	283
Buena Vista.....	...	18	19
Egg Harbor City.....	28	45	87
Egg Harbor Township.....	22	89	65
Galloway	6	51	84
Hamilton.....	17	31	26
Hammononton.....	19	84	45
Mullica... ..	4	6	14
Weymouth	1	9	9
	245	542	492

BERGEN COUNTY.

	M.	B.	D.
Englewood	85	67	67
Franklin	11	26	19
Harrington	12	88	87
Hobokus.....	10	39	88
Lodi.....	25	96	97
Midland.....	5	17	31
New Barbadoes.....	54	118	102
Orvil.	10	13	82
Palisade.. ..	17	34	28
Ridgefield.....	22	96	91
Ridgewood	11	19	20
Saddle River	2	28	26
Union	10	55	78
Washington.....	12	51	87
	286	692	698

BURLINGTON COUNTY.

	M.	■	D.
Bass River.....	6	18	15
Beverly.....	27	18	34
Bordentown.....	88	102	97
Burlington.....	101	80	105
Chester.....	28	69	■
Chesterfield.....	10	18	■
Cinnaminson.....	22	72	41
Delran.....	6	81	48
Eastampton.....	2	15	8
Evesham.....	8	21	19
Florence.....	8	52	27
Little Egg Harbor.....	9	81	29
Lumberton.....	2	22	19
Mansfield.....	7	24	80
Medford.....	17	25	41
Mount Laurel.....	■	22	11
New Hanover.....	20	50	40
Northampton.....	54	81	185
Pemberton.....	4	26	72
Randolph.....	2	6	7
Shamong.....	■	11	12
Southampton.....	12	42	30
Springfield.....	5	27	26
Washington.....	■	6	10
Westampton.....	■	18	8
Willingboro.....	7	5	9
Woodland.....	1	2	2
	392	918	1,031

CAMDEN COUNTY.

	M.	■	D.
*Camden City.....	4,936	1,111	1,205
Centra.....	8	60	44
Delaware.....	■	22	9
Gloucester City.....	88	150	188
Gloucester.....	18	70	78
Haddon.....	32	101	68
Stockton.....	35	86	127
Waterford.....	17	88	82
Winslow.....	16	32	84
	5,140	1,550	1,727

CAPE MAY COUNTY.

	M.	R.	D.
Cape May City.....	26	41	82
Dennis.....	11	31	37
Lower.....	10	50	81
Middle.....	11	42	48
Upper.....	17	34	18
	75	198	146

* Marriages of non-residents, 4,930.

CUMBERLAND COUNTY.

	M.	B.	D.
Bridgeton.....	106	246	178
Commercial.....	21	70	18
Deerfield.....	11	34	20
Downe.....	18	33	8
Fairfield.....	8	15	23
Greenwich.....	6	20	14
Hopewell.....	14	30	37
Landis.....	67	152	120
Lawrence.....	13	21	32
Maurice River.....	21	51	37
Millville.....	95	303	191
Stoe Creek.....	1	23	8
	380	998	686

ESSEX COUNTY.

	M.	B.	D.
Belleville.....	27	85	63
Bloomfield.....	42	171	109
Caldwell.....	18	33	50
Clinton.....	10	54	35
East Orange.....	86	179	144
Franklin.....	9	32	37
Livingston.....	7	14	8
Millburn.....	10	43	34
Montclair.....	54	130	114
Newark.....	1,542	4,751	4,133
Orange.....	177	467	373
South Orange.....	25	82	57
West Orange.....	19	64	70
	2,026	6,105	5,227

GLOUCESTER COUNTY.

	M.	B.	D.
Clayton.....	18	41	43
Deptford.....	8	30	24
East Greenwich.....	6	24	25
Franklin.....	5	46	35
Glassboro.....	32	63	47
Greenwich.....	10	31	31
Harrison.....	8	33	25
Logan.....	7	32	19
Mantua.....	10	35	25
Monroe.....	13	13	57
South Harrison.....	1	14	12
Washington.....	8	23	14
West Deptford.....	5	23	20
Woodbury.....	47	92	86
Woolwich.....	13	62	23
	186	577	497

PORT ON VITAL STATISTICS.

HUDSON COUNTY.

	M.	B.	D.
Bayonne.	90	267	845
Cliffside.	4	59	48
Harrison.	28	248	194
Hoboken.	482	1,282	1,061
Jersey City.	1,289	2,814	2,980
Kearny.	14	117	74
North Bergen.	26	88	220
Town of Union.	161	351	208
Union.	9	51	55
Weehawken.	2	26	48
West Hoboken.	76	270	218
	2,185	5,993	6,448

HUNTERDON COUNTY.

	M.	B.	D.
Albion.	7	18	14
Clinton.	28	83	48
Franklin.	26	44	34
Freehold.	82	49	41
Hamwell.	8	15	32
Irvington.	11	19	17
Madison.	29	24	10
Northampton.	14	88	28
Rocky Hill.	20	23	31
Shrewsbury.	4	28	18
Union.	56	61	57
West Amwell.	25	54	25
West Milford.	36	56	71
West Windsor.	19	85	42
Tewksbury.	14	68	20
Union.	7	18	11
West Amwell.	4	12	5
	339	614	494

MERCER COUNTY.

	M.	B.	D.
Chambersburg.	92	228	109
East Windsor.	25	60	49
Ewing.	5	10	97
Hamilton.	16	28	32
Hopewell.	45	68	61
Lawrence.	2	20	18
Millham.	15	49	65
Princeton.	29	65	65
Trenton.	680	622	671
Washington.	2	18	9
West Windsor.	9	24	29
	820	1,172	1,315

MIDDLESEX COUNTY.

	M.	B.	D.
Cranbury.....	20	30	27
East Brunswick.....	28	75	57
Madison.....	3	20	21
Monroe.....	20	89	45
New Brunswick.....	125	381	352
North Brunswick.....	11	16	24
Perth Amboy.....	54	145	173
Piscataway.....	15	57	51
Raritan.....	28	56	58
Sayreville.....	14	15	16
South Amboy.....	80	96	76
South Brunswick.....	13	41	46
Woodbridge.....	22	72	50
	873	1,048	991

MONMOUTH COUNTY.

	M.	B.	D.
Atlantic.....	4	18	9
Eatontown.....	16	20	29
Freehold.....	52	77	110
Holmdel.....	9	8	20
Howell.....	85	58	40
Long Branch.....	51	181	103
Manalapan.....	10	22	38
Marlboro.....	8	35	24
Matawan.....	29	50	67
Middletown.....	28	67	102
Millstone.....	6	24	38
Neptune.....	70	106	128
Ocean.....	6	29	42
Raritan.....	29	90	110
Shrewsbury.....	78	118	149
Upper Freehold.....	17	51	50
Wall.....	39	110	82
	487	1,004	1,141

MORRIS COUNTY.

	M.	B.	D.
Boonton.....	17	45	53
Chatham.....	29	63	87
Chester.....	14	48	22
Hanover.....	16	46	115
Jefferson.....	2	22	19
Mendham.....	11	17	27
Montville.....	6	9	19
Morristown.....	51	178	166
Mount Olive.....	12	21	26
Passaic.....	7	11	32
Pequannock.....	16	40	35
Randolph.....	51	125	119
Rockaway.....	41	100	130
Roxbury.....	12	68	86
Washington.....	10	59	25
	295	852	941

REPORT ON VITAL STATISTICS.

OCEAN COUNTY.

	M.	B.	D.
Key	26	18	18
	30	53	48
wood	5	44	28
	9	10	14
	1	25	14
ster	1	13	18
	6	13	11
	1	11	6
ad	14	89	80
	9	15	13
	7	19	20
	110	255	225

PASSAIC COUNTY.

	M.	B.	D.
ok	4	81	35
	16	68	34
	6	23	25
	87	278	208
	700		1,719
	14	88	34
	3	37	23
ilford	18	20	28
	912	2,803	2,102

SALEM COUNTY.

	M.	B.	D.
Alloway	11	18	23
Bisnboro		1	8
Lower Alloways Creek	8	15	15
Lower Penns Neck	7	9	15
Mannington	8	20	50
Oldmans	11	35	18
Pilesgrove	22	63	57
Pittsgrove	16	71	53
Quinton	6	23	16
Salem	68	98	108
Upper Penns Neck	24	55	35
Upper Pittsgrove	8	17	20
	184	425	417

SOMERSET COUNTY.

	M.	B.	D.
Bedminster.....	9	25	28
Bernards.....	22	81	45
Branchburg.....	8	6	19
Bridgewater.....	76	148	125
Franklin.....	16	45	50
Hillsborough.....	20	81	43
Montgomery.....	6	32	28
North Plainfield.....	28	86	66
Warren.....	5	10	18
	185	414	422

SUSSEX COUNTY.

	M.	B.	D.
Andover	6	28	10
Byram	18	32	15
Frankford.....	7	12	26
Green.....	4	10	4
Hampton.....	8	5	9
Hardyston	19	1	24
Lafayette.....	14	9	9
Montague.....	4	5	7
Newton.....	33	34	23
Sandyston.....	4	11	18
Sparta.....	10	18	32
Stillwater.....	13	15	15
Vernon.....	15	12	17
Walpack.....	2	6	3
Wantage.....	17	81	49
	164	219	261

UNION COUNTY.

	M.	B.	D.
Clark.....	...	4	6
Cranford.....	1	1	7
Elizabeth.....	281	304	758
Fanwood.....	5	19	12
Linden.....	4	12	48
New Providence.....	7	10	19
Plainfield.....	68	196	199
Rahway.....	68	125	140
Springfield.....	4	15	15
Summit.....	17	43	49
Union.....	5	27	41
Westfield.....	7	48	48
	467	1,394	1,342

REPORT ON VITAL STATISTICS.

WARREN COUNTY.

	M.	B.	D.
City	1	8	11
Warren	41	35	33
Union	16	20	17
Myers	7	12	24
Shelton	6	14	14
town	10	16	22
Warren	21	42	36
Warren	5	8	9
Warren	13	21	18
Warren	11	26	22
Warren	6	7	12
Warren	93	23	27
Warren	4	42	25
Warren	11	18	24
Warren	37	111	94
Warren	8		3
Warren	490	218	107
Warren	7	18	17
Warren	43	77	62
	624	706	582

riages of non-residents, 395.

TOTALS OF MARRIAGES, BIRTHS AND DEATHS FOR ALL THE COUNTIES.

	M.	B.	D.
Atlantic	245	542	492
Warren	236	692	698
Union	891	913	1,021
Camden	5,140	1,685	1,727
Cape May	75	198	146
Cumberland	380	928	686
Essex	2,026	6,105	5,227
Gloucester	186	577	497
Hudson	2,185	5,993	6,446
Hunterdon	339	584	494
Mercer	820	1,172	1,316
Middlesex	372	1,043	991
Monmouth	487	1,004	1,141
Morris	295	852	941
Ocean	110	285	225
Passaic	912	2,803	2,102
Salem	184	425	417
Somerset	185	414	422
Sumner	164	219	261
Union	487	1,394	1,342
Warren	824	706	582
	16,025	23,074	27,178

SES.

Allam
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RETURNS OF DEATHS FROM ALL CAUSES.

REPORT ON VITAL STATISTICS.

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.—By Counties.

COUNTIES.	DEATHS AT ALL AGES.					Population, census of 1880.	Death-rate per 1,000.	Deaths under five in each 100, or comparison of these with total deaths.	Comparative number deaths in each 100 from chief pre-ventable diseases.	PRINCIPAL CAUSES OF DEATH.																						
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.					Total, including undebbed.	Remittent fever, &c.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Krysipelas.	Diarrhoeal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous dis-eases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intesti-nal diseases.	Cancer.	Acute rheumatism.	Pneumonia.	Accident.	
Atlantic.....	121	60	46	146	124	492	17.97	34.76	21.54	23.01	1	1	8	...	3	2	2	14	4	73	20	28	45	36	49	26	8	7	28			
Bergen.....	147	74	67	216	190	686	17.25	31.66	25.60	17.40	6	6	17	...	17	1	2	49	4	82	37	37	74	35	57	23	64	43	15	12	48	
Burlington.....	202	113	94	276	327	1,081	17.25	30.35	26.14	17.91	7	7	42	1	22	...	9	62	6	117	54	66	65	63	67	27	94	85	23	9	42	
Camden.....	473	244	166	493	339	1,727	21.83	41.83	27.97	22.03	14	14	74	...	25	1	13	300	5	251	101	134	119	146	113	49	132	90	34	9	38	
Cape May.....	17	15	9	46	68	146	13.73	21.93	19.15	13.39	3	3	8	...	3	2	...	9	2	3	6	11	10	10	8	2	29	13	...	...	4	
Cumberland.....	163	97	63	163	200	686	13.73	36.44	26.34	16.34	4	4	14	...	3	4	1	73	2	79	47	61	70	36	38	24	66	44	25	...	7	16
Essex.....	1343	871	449	1647	907	6,277	15.83	42.86	27.45	34.45	40	40	93	...	44	12	26	456	2	725	266	308	604	476	294	229	267	249	116	21	41	215
Gloucester.....	117	64	59	120	137	497	15.83	36.42	27.77	16.01	25	25	9	...	24	1	3	36	3	58	26	33	43	34	44	10	41	35	11	...	7	19
Hudson.....	1735	1060	608	2191	840	6,446	51.59	43.35	26.54	26.63	74	74	159	...	140	32	54	673	36	903	423	344	890	568	345	213	335	253	115	26	56	264
Hanlerton.....	77	39	31	125	219	494	19.91	23.45	14.57	13.20	5	5	10	...	2	...	3	34	3	35	25	41	51	37	52	19	60	31	19	...	4	18
Mercer.....	328	156	111	408	298	1,316	19.91	36.81	26.39	19.69	9	9	20	...	4	4	23	114	8	105	172	66	125	67	65	53	136	73	30	7	16	68
Middlesex.....	195	147	104	279	245	991	14.74	34.51	26.36	17.64	13	13	30	...	10	...	4	101	4	119	54	60	106	53	65	36	61	51	33	5	11	72
Monmouth.....	252	146	141	396	292	1,143	18.44	23.13	27.26	18.31	9	9	21	...	23	3	6	92	7	145	53	66	107	54	98	66	106	79	81	7	16	44
Morris.....	179	108	122	245	281	941	18.49	30.61	24.80	18.57	4	4	13	...	11	...	0	106	7	120	47	51	76	32	61	30	135	62	27	6	6	49
Ocean.....	39	23	23	69	71	225	13.26	27.66	24.89	14.44	1	1	13	...	2	1	4	10	2	23	15	17	19	13	17	11	14	16	8	1	5	10
Passaic.....	512	402	212	609	328	2,102	15.29	41.91	30.07	25.34	20	20	30	...	13	4	1	116	9	269	124	121	216	183	120	73	161	101	25	6	23	63
Salmon.....	78	47	49	94	141	417	20.373	20.98	23.02	16.43	3	3	9	...	6	...	2	31	3	42	19	23	40	21	32	16	39	29	10	8	10	...
Somerset.....	72	46	34	115	155	472	15.81	27.98	22.04	15.39	2	2	2	...	11	...	1	19	5	63	26	29	29	13	35	27	64	28	12	1	4	31
Somerset.....	39	19	17	73	111	261	15.29	22.22	10.71	11.66	...	...	9	...	2	2	3	...	...	21	22	14	25	9	26	11	36	17	10	2	1	14
Union.....	374	180	131	390	304	1,342	17.57	33.30	27.27	21.86	29	29	26	...	8	2	19	103	5	173	66	75	157	86	78	61	108	73	26	10	5	78
Warren.....	109	72	61	151	187	582	16.00	31.20	25.08	18.42	7	7	11	...	26	...	3	36	...	63	38	40	52	31	43	26	49	26	18	1	9	24
Totals.....	6334	3974	2605	8162	5747	27,173	17.61	39.67	27.13	31.26	264	630	5	574	74	161	161	2366	128	3508	1725	1635	3922	1671	1691	1020	2965	1476	618	148	271	1320

Of those dying under one year, 1,770 died under one month, of which 1,313 died in the large cities. Of those dying under one year, 4,616 died in the large cities. Of the 16,008 that died under five years, 7,435 died in the large cities. Total death-rate from consumption for the State, as compared with the total death-rate, 12.44, the deaths being 2,325 in cities, 1,122 outside. Rates for short periods, or which deal with small numbers, are only approximate, since temporary causes may have been in operation, and small numbers do not eliminate or balance errors which practically disappear in large aggregates. The number of deaths before twenty, in proportion to the rest, is much more informative as to local causes affecting health than the total deaths. See, also, the number dying from communicable diseases.

Return of Deaths from all Causes and Certain Specified Diseases, in the Cities of the State of New Jersey, of over 5,000 Population, for the Year ending June 30th, 1888.

[illegible]

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.

ATLANTIC COUNTY POPULATION, 1880. Statistical Divisions.	DEATHS AT ALL AGES.						Population, census of 1880.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Total, including under- died.			Remittent fever, &c.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Group and diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption—males.	Consumption—females.	Acute lung diseases.	Brain and nervous dis- eases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intesti- nal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Absecon	1	1	1	3	3	10	567	17.6	2	1	1	1	1	1	1	4	1	1	16	3	14	1	1	3	3	4	1		
Atlantic City	57	23	57	74	41	253	7,942	29.34	2	1	1	1	1	1	1	43	13	1	16	3	3	14	34	14	3	4	1		
Barnegat	1	1	1	6	7	19	1,016	0.49	1	1	1	1	1	1	1	1	3	1	3	1	2	1	1	1	1	1	1		
Beg Harbor City.	13	2	1	11	12	37	1,317	2.81	1	1	1	1	1	1	1	5	2	1	3	2	4	1	2	2	2	2	1		
Beg Harbor Township.	17	11	2	19	15	65	2,919	2.19	1	1	1	1	1	1	1	10	3	1	3	3	3	1	4	3	1	1	1		
Galloway.	5	1	2	14	13	34	2,133	0.80	1	1	1	1	1	1	1	1	5	1	3	1	1	1	1	1	1	1	1		
Hamilton	4	3	2	6	11	26	1,484	1.75	2	1	1	1	1	1	1	2	1	1	3	2	1	1	4	2	1	1	1		
Hammononton	11	8	9	10	13	43	3,325	1.26	2	1	2	1	2	1	1	4	1	1	3	2	1	1	4	2	1	1	1		
Mullica	2	1	1	4	7	14	807	1.86	1	1	1	1	1	1	1	2	2	1	1	1	1	1	4	2	1	1	1		
Weymouth	1	2	2	1	3	9	626	1.44	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Total	121	60	46	148	124	499	21,306	23.01	1	5	3	3	3	14	4	73	50	29	42	36	26	49	26	8	3	7	25		

* This and all other cities that are health resorts have an excessive death-rate by reason of temporary increase of population, which also includes a proportion of invalids above the average. Local Boards show this on their record.

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.

DEATHS AT ALL AGES.										PRINCIPAL CAUSES OF DEATH.																		
Under one year.	One to five.	Six to twenty.	Twenty to fifty.	Over fifty.	Total, including under five.	Population, census of 1885.	Death-rate per 1,000.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Group and diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption—male.	Consumption—female.	Acute lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.	
Englewood	14	7	4	21	19	67	4,429	1	1	2	1	1	2	1	10	7	4	2	1	1	1	1	1	1	1	1	1	4
Franklin	2	2	3	5	7	19	2,194	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Harrington	5	3	1	12	10	27	2,004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hoboken	8	1	5	10	14	28	2,806	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1
Lodi	23	12	12	24	17	97	4,247	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1
Midland	8	4	2	5	14	31	1,617	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1
New Barbados	24	11	12	25	29	103	4,893	1	1	1	1	1	1	1	16	1	1	1	1	1	1	1	1	1	1	1	1	1
Orrville	4	1	1	11	8	25	2,533	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Palmdale	17	10	8	28	24	91	4,457	1	1	1	1	1	1	1	6	4	6	6	6	6	6	6	6	6	6	6	6	10
Ridgewood	7	1	1	7	4	20	1,776	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1
Ridgewood	7	1	1	11	4	26	1,584	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	5
Saddle River	17	10	6	24	15	72	3,914	1	1	1	1	1	1	1	12	6	4	4	4	4	4	4	4	4	4	4	4	2
Union	3	1	1	13	16	27	2,714	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Washington	167	74	67	216	100	694	39,680	6	17	17	1	2	49	4	63	37	37	74	23	57	25	64	43	16	7	13	43	43
Total	167	74	67	216	100	694	39,680	6	17	17	1	2	49	4	63	37	37	74	23	57	25	64	43	16	7	13	43	

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.

DEATHS AT ALL AGES.										PRINCIPAL CAUSES OF DEATH.									
BURLINGTON COUNTY										Adult brain and spinal diseases.									
POPULATION, 57,466.										Dysentery and intestinal diseases.									
Statistical Divisions.										Cancer.									
Under twenty.										Acute rheumatism.									
One to five.										Puerperal.									
Five to twenty.										Accident.									
Twenty to sixty.																			
Over sixty.																			
Total, including un-																			
deceased.																			
Population, census of 1880.																			
Death-rate per 1,000.																			
Base River										Typhoid fever.									
Beverly										Small-pox.									
Bordentown										Scarlet fever.									
Burlington										Measles.									
Chester										Whooping-cough.									
Chesterfield										Croup and diphtheria.									
Cinnaminson										Erysipelas.									
Dairan										Dysentery and cholera.									
Eastampton										Consumption—male.									
Freeham										Consumption—female.									
Florence										Acute lung diseases.									
Little Egg Harbor										Brain and nervous diseases of children.									
Lumberton										Diseases of heart and circulation.									
Mansfield										Urinary diseases.									
Medford										Adult brain and spinal diseases.									
Mount Laurel										Digestive and intestinal diseases.									
New Hanover										Cancer.									
Northampton										Acute rheumatism.									
Pemberton										Puerperal.									
Randolph										Accident.									
Rhamong																			
Southampton																			
Springfield																			
Washington																			
Westampton																			
Willington																			
Woodland																			
Totals																			

REPORT ON VITAL STATISTICS.

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.

ESSEX COUNTY. POPULATION, 212,764 Statistical Divisions.	DEATHS AT ALL AGES.						Population, census of 1885.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																			
	Under one year.	One to five.	Five to twenty.	Twenty to thirty.	Over thirty.	Total, including under-fives.			Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Myxomatosis.	Diarrhoeal diseases.	Consumption—male.	Consumption—female.	Acute lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Aneurysm.	Pneumonia.	Accident.
Bellefonte	16	9	3	32	13	63	2,256	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Bloomfield	24	15	8	25	23	109	2,403	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Caldwell	7	6	1	15	21	50	2,336	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Clinton	7	7	2	8	11	35	2,630	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
East Orange	35	24	13	25	36	144	10,828	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Franklin	6	5	6	14	9	37	1,602	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Livingston	8	5	1	1	2	6	1,275	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Milburn	1	5	4	15	4	34	2,023	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Montclair	19	19	7	30	31	114	6,327	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Newark	1107	703	372	1236	635	4,133	152,936	41	76	34	10	19	397	30	576	327	330	433	300	216	163	261	160	91	16	23	168	
Orange	84	57	26	145	65	273	15,231	5	4	1	1	3	17	1	61	32	17	40	21	20	24	31	26	5	3	4	19	
South Orange	10	8	3	16	12	57	4,225	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
West Orange	19	10	4	26	14	70	2,612	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Totals.	1843	871	449	1647	908	6,327	212,764	24.45	53	92	44	12	25	436	26	725	306	300	604	476	294	227	267	349	119	21	41	219

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.

DEATHS AT ALL AGES.										PRINCIPAL CAUSES OF DEATH.																					
GLOUCESTER COUNTY.										Population, census of 1885.	Death-rate per 1,000.																				
Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Total, including under five.	Hemiplegic fever, &c.	Typhoid fever.	Small-pox.	Scarlet fever.			Measles.	Whooping-cough.	Croup and diphtheria.	Kryupolia.	Diarrhoeal diseases.	Consumption—male.	Consumption—female.	Acute lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Gonorr.	Acute rheumatism.	Pneumonia.	Accident.			
Clayton.	13	6	9	11	9	48	2,300																								
Deptford.	8	1	1	7	6	24	1,744																								
East Greenwich.	6	5	1	3	15	30	1,323																								
Franklin.	4	4	3	13	13	37	2,352																								
Glassboro.	13	9	9	11	5	47	2,377																								
Greenwich.	10	3	1	7	11	31	1,780																								
Harrison.	1	1	3	6	14	25	1,637																								
Logan.	2	3	3	7	6	19	1,053																								
Mantua.	7	2	2	3	13	25	1,434																								
Monroe.	15	8	11	10	7	51	1,800																								
South Harrison.	3	1	4	4	6	18	1,091																								
Washington.	3	—	1	2	0	6	1,305																								
West Deptford.	6	3	3	4	4	20	1,306																								
Woodbury.	19	13	13	19	53	106	2,378																								
Woodwick.	3	9	1	3	3	20	2,046																								
Totals.	117	64	66	130	137	497	27,403	13.91																							

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.

HUDSON COUNTY. POPULATION, 340,342. Statistical Divisions.	DEATHS AT ALL AGES.						Population, census of 1880.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																					
	Under one year.		Five to twenty.		Twenty to fifty.				Over fifty.		Total, including under-fined.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrheal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Tertiary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
	Under one year.	One to five.	Five to twenty.	Twenty to fifty.	Over fifty.	Total, including under-fined.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.																				
Bayonne.....	129	63	34	26	23	316	12,000	26.28	316	9	1	1	4	4	28	2	53	7	14	54	37	14	11	9	9	2	3	2	2	23
Guilford.....	12	8	6	11	7	43	1,613	2.65	43	6	1	1	3	3	4	1	1	0	3	7	7	4	1	1	3	1	1	1	1	1
Harrison.....	51	30	21	59	33	194	6,806	28.50	194	9	1	1	2	15	15	1	28	13	3	34	25	4	0	11	9	4	1	4	1	10
Hoboken.....	204	176	30	237	98	1,081	37,731	29.13	1,081	15	13	13	8	25	76	4	181	39	46	123	95	65	59	51	47	20	4	0	2	28
Jersey City.....	1049	661	377	1243	635	4,960	133,513	26.93	4,960	114	119	119	10	35	265	15	513	267	325	519	335	205	134	32	178	66	19	30	304	
Kearny.....	23	10	2	32	7	74	3,338	3.14	74	1	1	1	1	1	1	1	10	2	4	11	11	2	1	3	4	1	1	1	1	14
North Bergen.....	23	15	19	90	60	230	6,456	35.63	230	1	1	1	1	1	15	3	18	32	17	20	9	15	9	26	10	4	2	1	1	13
Town of Union.....	99	87	19	63	27	296	8,396	34.77	296	6	4	4	1	3	30	1	40	17	10	37	13	11	4	6	12	8	1	3	3	8
Union.....	13	9	5	13	12	56	1,781	3.11	56	1	1	1	1	1	4	1	10	1	1	14	4	8	3	3	3	3	1	1	1	3
Weehawen.....	9	5	1	26	7	43	1,499	28.65	43	1	1	1	1	1	1	1	4	0	0	2	3	1	2	3	4	1	1	1	1	3
West Hoboken.....	61	41	23	48	35	216	7,163	34.35	216	6	1	1	1	1	26	1	39	9	12	24	20	21	0	13	9	0	1	1	1	9
Total.....	1435	1050	608	2194	810	6,446	340,342	26.23	6,446	159	140	140	33	34	473	26	902	423	344	880	583	345	313	305	282	115	29	53	351	351

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.

DEATHS AT ALL AGES.										PRINCIPAL CAUSES OF DEATH.																			
MIDDLESEX COUNTY. POPULATION, 66,180. Statistical Divisions.						Total, including under- Over sixty.	Population, census of 1885.	Death-rate per 1,000.	Religions fever, &c.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Kryipelas.	Diarrhoeal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Pneumonia.	Accident.
Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.																									
Tranbary.	6	1	3	4	11	27	1,859	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
East Brunswick.	6	1	3	3	4	37	3,697	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Madison.	2	3	3	9	4	31	1,512	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Monroe.	9	7	3	14	12	45	3,199	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
New Brunswick.	59	64	45	99	87	323	18,238	3	14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
North Brunswick.	8	..	..	8	8	24	1,372	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Perth Amboy.	48	40	22	43	18	172	6,211	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Piscataway.	14	1	4	14	18	51	2,155	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Raritan.	7	3	6	11	20	53	2,866	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sayreville.	7	3	..	5	1	16	2,519	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
South Amboy.	12	14	10	24	16	76	4,054	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
South Brunswick.	5	5	4	15	15	44	2,714	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Woodbridge.	11	7	2	15	15	50	4,227	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Totals.	185	147	100	279	246	991	66,180	13	30	..	10	..	4	101	4	119	64	60	104	27	68	26	61	21	23	0	11	72	..

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.

MONMOUTH COUNTY. POPULATION, 1880. Statistical Divisions.	DEATHS AT ALL AGES.						Population, census of 1880.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Total, including under five.			Hemorrhagic fever, &c.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Typhoid.	Diarrhoeal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Atlantic	1	1	1	2	6	11	1.66	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Barnegat	1	1	1	1	1	5	2.01	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Freehold	13	12	8	36	38	110	4.04	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Holmdel	2	1	2	7	8	20	1.60	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Howell	2	6	4	14	13	40	2.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Long Branch	24	10	13	23	16	100	2.00	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Manalapan	10	7	5	8	11	33	2.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Marlboro	7	1	3	4	6	21	2.00	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Matawan	13	13	15	13	14	67	2.76	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Middletown	27	9	7	27	22	103	2.32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Millstone	5	1	6	12	9	33	1.97	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Neptune	21	26	16	31	25	125	6.41	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Ocean	14	9	5	9	0	42	2.40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Raritan	17	16	25	24	26	110	4.20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Shrewsbury	26	21	17	47	36	149	7.36	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Upper Freehold	7	6	7	9	10	50	3.10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Wall	21	5	7	21	23	82	4.80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total	303	141	208	299	299	1,141	18.31	9	17	20	5	6	7	140	15	4	5	11	3	6	2	0	3	7	10	4	4	4	

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.

DEATHS AT ALL AGES.										PRINCIPAL CAUSES OF DEATH.																			
Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Total, including under five.	Population, census of 1880.	Death-rate per 1,000.	Principal Causes of Death.																					
								Remittent fever, &c.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria.	Kyrtelias.	Diarrheal disease.	Consumption—male.	Consumption—female.	Acute lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.	
Beacon	7	7	14	11	14	53	2,732	1	1	1	1	1	1	13	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Chatham	17	6	6	25	33	37	4,291	1	1	1	1	1	1	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Obispo	5	2	1	5	8	32	2,010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hamover	5	1	9	24	45	115	4,459	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Jefferson	5	1	3	7	15	19	1,359	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mendham	4	1	1	6	13	27	1,421	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Montville	4	2	2	4	7	19	1,225	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Morristown	22	16	17	41	59	166	8,760	1	1	1	1	1	1	13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mount Olive	5	3	4	6	18	25	2,005	1	1	1	1	1	1	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Parsippany	2	3	4	5	12	32	1,716	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pennsauken	10	1	3	15	29	36	2,623	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Randolph	38	33	25	35	136	149	7,045	1	1	1	1	1	1	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rockaway	21	25	27	19	102	136	6,573	1	1	1	1	1	1	32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Roxbury	10	3	4	9	26	36	2,154	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Washington	2	4	2	7	15	25	2,560	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Totals.						20,675	16.57	9	13	1	11	1	8	106	7	120	47	51	76	32	61	20	135	52	37	6	6	49	

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.

OCEAN COUNTY. POPULATION, 18,468. Statistical Divisions.	DEATHS.						Population, census of 1880.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																									
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Total, including under-aged.			Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Pneumonia.	Accidents.						
Berkeley	1	2	4	20	15	42	714	13	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Brick	1	2	4	20	15	48	2,974	48	15	20	1	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dover	1	2	4	20	15	38	2,994	36	12	10	1	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eagleswood.	1	2	4	20	15	16	481	16	9	4	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackson	1	2	2	2	2	14	1,783	14	9	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lacey	1	1	1	1	1	16	748	16	9	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manchester.	1	1	2	4	3	11	1,006	11	9	4	3	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ocean.	1	1	1	1	2	6	541	9	9	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plumstead	1	1	3	9	9	20	1,546	20	9	3	3	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stafford	1	1	1	5	3	13	1,026	13	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Union.	1	3	1	2	7	20	1,063	20	7	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals.	29	23	23	89	71	285	15,566	144	1	13	2	1	4	10	3	23	15	17	1	3	4	1	10	13	17	11	14	16	6	1	5	1	2	0

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year ending June 30th, 1888.

DEATHS AT ALL AGES.										PRINCIPAL CAUSES OF DEATH.																							
Under one year.					Over sixty.					Total, including under and over.	Population, census of 1885.	Death-rate per 1,000.	Hepatitis fever, &c.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Under one year.																													
Acquackanonk	5	5	11	5	2,038	2.45	1	1	1	2	1	1	1	1	4	4	1	2	2	1	1	1	2	2	1	1	1	1	1	1	1	1	
Little Falls	10	3	9	3	1,701	5.88	1	1	1	1	1	1	1	1	4	4	1	2	2	1	1	1	2	2	1	1	1	1	1	1	1	1	
Manchester	6	4	9	3	1,038	5.78	1	1	1	1	1	1	1	1	2	2	1	2	2	1	1	1	2	2	1	1	1	1	1	1	1	1	
Passaic	60	23	45	23	8,325	34.25	3	7	1	2	1	1	15	1	45	10	6	23	16	9	6	12	10	2	3	2	2	2	2	2	2	2	
Paterson	434	345	168	249	83,374	27.17	13	31	1	173	3	1	97	9	208	112	108	170	164	97	60	79	61	28	5	38	25	2	2	2	2	2	
Pompton	8	3	1	10	2,109	4.74	1	1	1	1	1	1	2	1	1	4	3	2	2	4	1	1	1	1	1	1	1	1	1	1	1	1	
Wayne	5	1	5	11	1,808	6.08	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	
West Milford	4	3	5	11	2,422	4.54	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Totals	542	403	212	600	83,374	25.24	20	20	1	181	4	1	118	9	208	134	121	216	165	120	78	101	101	24	8	32	23	23	23	23	23	23	

II. MORTALITY IN VARIOUS CITIES OF THE UNITED KINGDOM OF GREAT BRITAIN
OF OVER 100,000 INHABITANTS.

Towns.	Annual Rate to 1,000 of Population, of Deaths in 52 Weeks, Ending Dec. 31st, 1887.	Population on Acre.
London	19.5	*56.0
Brighton.....	16.8	47.0
Portsmouth	19.4	31.9
Bristol.....	20.3	48.3
Birmingham	19.6	52.5
Leicester.....	19.4	44.7
Nottingham.....	18.6	22.5
Bolton.....	21.2	46.7
Manchester.....	28.6	87.9
Salford	22.1	42.3
Oldham.....	23.7	28.4
Blackburn.....	25.4	16.8
Preston	27.8	27.5
Bradford.....	19.8	20.8
Leeds	21.0	16.0
Sheffield.....	21.5	16.1
Hull	19.1	24.9
Sunderland.....	19.6	42.8
Newcastle-on-Tyne	25.2	29.2
Cardiff.....	21.8	14.2
Edinburgh.....	19.7	43.8
Glasgow	23.1	85.8
Dublin.....	30.5	14.3
Liverpool.....	23.6	113.8

* London has less population to the house than any of the larger European cities.

DECENNIAL TABLES.

The following are the tables of ten previous years, so combined as to give the means and other averages for the various years and then the totals. In some cases the data were not complete for all the years, but only for five years, and so those have been given.

*Statement of Marriages, including all Supplements, for the Ten Years
ending June 30th, 1888.*

	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	Supple- ments.	Totals.
Atlantic County....	92	82	86	89	91	119	106	100	100	98	21	1,013
Atlantic City.....	19	28	31	45	67	74	96	99	135	152	19	790
Bergen County.....	188	183	187	223	178	200	217	283	224	296	24	2,108.
Burlington County....	261	274	262	268	274	280	284	258	220	268	87	2,622.
Bordentown.....	47	47	38	47	58	40	52	39	55	33	2	454
Burlington City....	65	67	47	59	54	58	70	33	23	101	11	411
Camden County.....	75	112	90	81	77	81	72	98	126	116	8	913
Camden City.....	241	424	269	443	481	493	682	478	4,780	4,985	59	15,476.
Gloucester City....	26	41	32	39	44	39	80	43	56	58	2	442
Cape May County..	66	78	65	68	59	78	72	62	61	75	25	705.
Cumberland Co.....	129	140	140	167	182	141	174	180	156	100	19	1,807
Bridgeton.....	22	129	96	113	99	113	111	96	92	105	2	1,089
Millville.....	62	90	22	100	71	100	79	97	97	95	6	870
Essex County.....	211	212	188	225	203	210	205	259	288	307	104	2,384.
Newark.....	1,022	1,141	1,226	1,268	1,298	1,257	1,274	1,416	1,468	1,542	492	12,529
Orange.....	90	108	92	126	122	99	132	149	149	177	14	1,253.
Gloucester County..	175	166	190	169	165	166	186	202	202	186	23	1,823
Hudson County.....	45	43	38	54	108	99	91	91	116	131	145	980.
Bayonne.....	15	22	47	61	61	66	59	81	99	99	77	697
Harrison.....	9	6	9	6	31	20	14	19	27	28	118	262
Hoboken.....	221	198	214	230	249	265	215	456	413	482	250	2,465.
Jersey City.....	575	706	765	829	946	960	877	952	1,212	1,289	1,068	10,292.
Town of Union....	84	45	47	65	89	92	101	114	124	151	50	916
Hunterdon County..	295	276	248	242	261	256	294	214	354	339	78	2,932.
Mercer County.....	129	126	126	124	108	95	103	139	144	148	13	1,255.
Chambersburg....	30	39	28	31	47	42	45	88	100	92	1	588
Trenton.....	264	326	323	344	347	280	280	473	549	580	41	3,937
Middlesex County..	182	163	149	170	215	169	167	180	167	194	41	1,747
New Brunswick..	107	116	142	178	150	149	149	168	145	125	7	1,436.
Perth Amboy.....	15	22	22	75	55	66	41	45	61	54	.....	454
Monmouth County..	325	414	392	398	438	421	433	424	455	426	59	4,195
Long Branch.....	49	46	61	47	83	71	67	60	59	51	9	583
Morris County.....	221	271	271	279	298	243	221	253	260	244	40	2,801
Morristown.....	41	39	27	29	49	54	59	54	53	51	23	488
Ocean County.....	84	103	94	84	107	112	93	126	180	110	36	1,079.
Passaic County.....	50	86	81	.....	70	44	75	69	53	56	13	673
Passaic City.....	42	49	66	71	67	71	59	63	99	87	45	702
Paterson.....	347	431	522	563	594	469	562	563	708	769	100	5,633
Salem County.....	124	123	109	99	108	114	91	112	98	116	20	1,109
Salem City.....	68	33	23	51	50	44	53	55	76	68	8	549
Somerset County....	159	162	181	164	168	163	185	.....	.....	185	21	1,756
Sussex County.....	169	177	156	179	198	163	159	197	191	164	25	1,792
Union County.....	33	54	49	44	63	64	55	74	59	50	29	579
Elizabeth.....	166	153	223	269	241	263	259	240	242	281	8	2,350
Plainfield.....	19	57	49	67	57	31	51	64	38	63	24	575
Rahway.....	58	59	43	51	56	58	46	44	61	63	53	602
Warren County.....	220	202	232	195	223	186	193	264	297	334	42	2,399
Phillipsburg.....	51	56	73	54	82	53	66	301	492	490	13	1,742
Totals.....	7,096	7,966	8,109	8,337	9,166	8,963	.....	12,251	15,416	16,025	8,306	106,199.

Statement of Births, including all Supplements, for the Ten Years ending June 30th, 1888.

	1878-79.	1879-80.	1.	1881-82.	1882-83.	1.	1884-85.	1885-86.	1886-87.	1887-88.	Supple- ments.	Totals.
Atlantic County.....	290	281	294	272	262	293	343	290	347	348	20	3,085
Atlantic City.....	62	120	120	90	100	156	172	205	231	199	1	1,456
Bergen County.....	626	748	678	666	676	679	729	702	785	692	284	7,112
Burlington County.....	877	915	804	749	753	784	781	728	802	722	809	8,229
Bordentown.....	188	124	126	107	136	183	110	100	180	102	20	1,231
Burlington City ..	145	135	142	83	132	144	132	140	126	89	98	1,361
Camden County.....	335	348	324	331	326	347	373	371	415	424	44	3,640
Camden City.....	368	718	639	696	762	807	860	875	923	1,111	110	8,892
Gloucester City...	126	140	129	159	184	145	129	68	182	150	72	1,378
Cape May County...	195	232	183	227	215	221	245	197	219	198	49	2,174
Cumberland Co.....	390	377	370	383	404	410	421	477	510	449	362	4,598
Bridgeton.....	219	205	207	219	255	242	258	271	274	246	2	2,386
Millville.....	218	201	262	266	244	340	255	291	279	303	29	2,588
Essex County.....	740	752	888	836	872	868	798	836	747	887	281	8,455
Newark.....	3,567	3,513	3,737	3,646	3,952	3,889	3,494	4,311	4,540	4,751	1,980	41,335
Orange	435	429	408	417	418	380	449	416	468	467	11	4,293
Gloucester County..	613	688	649	626	610	640	588	647	677	677	49	6,386
Hudson County.....	264	258	287	267	256	289	402	468	510	611	327	4,114
Bayonne.....	140	190	185	161	211	229	196	276	298	287	307	2,520
Harrison.....	102	132	120	148	164	198	168	207	249	248	72	1,808
Hoboken.....	795	784	783	696	783	961	816	889	1,173	1,282	1,019	10,080
Jersey City.....	1,532	1,528	1,437	1,288	1,571	1,841	1,861	2,155	2,508	3,314	2,294	21,182
Town of Union...	140	142	146	150	174	226	216	225	284	251	87	2,096
Hunterdon County	800	739	755	650	629	634	604	684	684	179	6,837	
Mercer County.....	408	410	370	356	372	372	307	256	322	64	3,678	
Chambersburg....	114	98	141	149	163	168	111	121	172	228	25	1,506
Trenton	596	563	586	588	533	636	489	488	582	622	77	5,810
Middlesex County..	461	553	519	534	547	529	505	527	545	517	152	5,338
New Brunswick..	428	453	430	406	432	462	430	382	386	381	98	4,282
Perth Amboy.....	77	204	145	190	216	228	196	206	176	145	35	1,611
Monmouth County.	958	1,013	1,028	964	970	1,056	973	1,079	982	873	150	10,086
Long Branch	222	156	140	165	204	212	242	101	141	131	3	1,717
Morris County.....	816	882	864	856	894	797	749	683	784	674	250	8,243
Morristown.....	127	130	115	104	119	165	145	164	153	178	23	1,428
Ocean County.....	313	319	323	321	294	338	310	310	277	255	96	3,180
Passaic County.....	141	208	164	209	187	174	182	180	192	192	33	1,905
Passaic City	204	216	208	214	247	194	265	246	288	278	.....	2,360
Paterson	1,218	1,322	1,469	1,517	1,617	1,641	1,605	1,534	1,839	1,833	26	15,820
Salem County.....	429	442	389	364	311	367	340	319	312	327	60	3,560
Salem City.....	89	88	97	110	115	128	122	115	104	98	32	1,091
Somerset County ...	607	564	513	439	467	446	442	468	446	414	82	4,834
Sumner County.....	355	321	295	287	249	234	227	251	288	219	118	2,844
Union County.....	213	239	227	203	229	216	215	211	212	179	89	2,239
Elizabeth	747	679	707	813	831	925	913	882	885	894	13	8,289
Plainfield	188	166	161	146	191	163	174	122	169	196	14	1,690
Rahway.....	105	132	114	96	117	97	74	103	126	125	102	1,191
Warren County, ...	549	682	616	664	571	673	661	605	581	485	44	6,000
Phillipsburg....	213	208	249	243	251	263	234	219	210	218	1	2,311
Totals.....	23,116	23,680	23,484	23,108	24,480	25,263	24,077	25,497	27,340	28,074	9,481	257,560

*Statement of Deaths, including all Supplements, for the Ten Years
ending June 30th, 1888.*

	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	Supple- menta.	Totals.
Atlantic County.....	283	221	211	294	217	209	245	204	228	259	19	2,397
Atlantic City.....	64	93	134	174	144	178	187	167	214	233	.....	1,559
Bergen County	536	510	558	649	642	535	802	587	663	.....	76	6,156
Burlington County.....	749	596	523	592	606	558	631	578	660	759	129	6,000
Bordentown.....	88	90	87	90	90	105	98	98	78	97	2	911
Burlington City.....	154	118	182	166	184	187	188	165	188	165	12	1,499
Camden County.....	314	297	354	285	340	243	310	296	332	384	64	3,219
Camden City.....	678	808	954	1,028	834	932	968	1,019	1,079	1,205	13	9,903
Gloucester City.....	72	64	108	98	117	118	92	99	137	138	2	1,063
Cape May County.....	120	126	132	134	131	144	161	150	174	146	33	1,452
Cumberland Co.....	358	232	236	343	275	304	357	276	282	317	32	3,132
Bridgeton.....	133	155	172	208	185	163	179	120	163	178	2	1,608
Millville.....	137	174	174	136	140	142	149	139	146	191	14	1,642
Essex County.....	616	526	521	663	626	548	633	568	549	721	145	6,111
Newark.....	3,116	2,858	2,884	3,923	3,480	3,372	3,729	3,663	3,734	4,183	63	34,697
Orange.....	215	216	239	337	288	291	300	304	332	378	3	2,897
Gloucester County.....	431	375	393	471	407	.....	461	461	443	497	19	4,384
Hudson County.....	874	967	828	598	527	450	505	571	521	668	15	4,912
Bayonne.....	156	141	154	258	196	208	243	311	303	345	3	2,313
Harrison.....	104	129	138	172	153	152	169	177	182	194	2	1,582
Hoboken.....	669	734	786	976	804	706	843	925	916	1,061	18	8,496
Jersey City.....	2,517	2,533	2,851	3,648	3,106	3,041	3,442	3,330	3,686	3,980	99	32,289
Town of Union.....	137	121	229	216	209	187	217	135	191	208	8	1,863
Hunterdon County.....	527	475	529	570	549	429	466	436	431	494	63	5,089
Mercer County.....	364	321	337	459	447	368	422	330	425	475	62	4,060
Chambersburg.....	92	109	97	138	119	124	140	171	178	169	10	1,347
Trenton.....	653	618	565	615	622	632	601	520	612	671	24	6,133
Middlesex County.....	435	425	448	530	486	431	444	482	389	456	41	4,577
New Brunswick.....	325	289	323	390	460	397	336	343	350	352	8	3,558
Perth Amboy.....	77	83	79	135	139	150	166	121	150	173	.....	1,273
Monmouth County.....	756	669	770	1,002	905	766	939	837	953	1,033	61	8,696
Long Branch.....	170	63	115	147	123	92	126	66	72	103	3	1,110
Morris County.....	715	557	735	878	779	606	680	617	697	775	107	7,146
Morristown.....	114	128	109	121	198	142	128	120	119	166	9	1,354
Ocean County.....	217	162	.....	220	203	226	268	220	211	225	30	2,180
Passaic County.....	169	152	160	190	158	119	175	134	189	180	23	1,599
Passaic City.....	124	142	129	149	135	154	139	175	190	203	.....	1,541
Paterson.....	994	1,174	1,161	1,512	1,415	1,445	1,284	1,100	1,402	1,719	8	13,215
Salem County.....	280	236	279	358	299	298	243	266	251	314	32	2,906
Salem City.....	112	76	74	98	117	78	106	123	89	108	16	992
Somerset County.....	429	343	405	504	449	348	418	342	436	422	26	4,122
Sussex County.....	330	284	320	459	315	293	324	273	296	261	59	3,214
Union County.....	195	186	196	231	210	187	220	170	204	245	34	2,078
Elizabeth.....	472	440	564	612	686	591	697	607	717	758	4	6,148
Plainfield.....	130	98	130	151	161	132	141	153	153	199	1	1,449
Rahway.....	169	116	104	133	131	111	107	100	116	140	9	1,236
Warren County.....	420	406	417	649	444	359	392	374	391	475	38	4,365
Phillipsburg.....	102	126	114	169	147	130	148	116	155	107	.....	1,314
Totals.....	20,440	18,987	20,512	25,969	23,810	21,716	23,807	22,734	24,331	27,173	1,460	.....

Summary of Vital Facts from New Jersey Death Record, by Counties, for Ten Years ending June 30th, 1888.

COUNTIES.	DEATHS AT ALL AGES.						Population, census of 1880.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																	
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Total, including under five.			Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Group and diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Disease of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.
Atlantic	1,009	521	211	1,047	1,009	3,598	11.1	11	13	50	16	44	168	24	503	524	265	265	235	156	312	234	69	10	45	
Bergen	1,265	764	574	1,803	1,821	5,467	15.3	153	133	186	23	47	227	29	602	752	702	432	432	241	454	232	127	24	69	
Burlington	1,003	1,066	783	2,479	2,731	7,022	8.3	83	19	143	26	87	405	47	913	1,265	785	513	623	314	736	568	233	37	101	
Camden	3,065	1,954	1,308	4,060	2,535	11,260	13.7	137	300	224	31	112	676	30	1,391	1,971	1,188	1,000	787	145	964	676	330	30	148	
Cape May	313	142	100	543	467	1,525	10.5	105	51	28	7	20	42	5	148	149	139	26	75	31	193	101	57	3	10	
Cumberland	1,394	845	573	1,661	1,682	5,155	27.7	277	210	136	26	38	353	32	683	1,011	365	433	392	207	478	380	140	30	67	
Essex	10,263	7,059	4,119	14,068	7,656	33,105	32.9	329	1,071	1,337	304	347	3,098	194	4,603	6,477	4,029	3,792	2,446	1,697	2,917	1,836	964	103	454	
Gloucester	950	539	306	1,177	1,235	3,030	45.1	451	121	94	10	41	170	20	601	644	403	294	363	108	367	277	96	19	27	
Hudson	13,233	9,068	5,045	16,770	6,264	34,380	66.1	661	1,285	1,643	412	354	2,463	186	6,444	6,440	6,017	4,303	2,344	1,038	2,442	2,027	453	144	634	
Hunterdon	769	451	417	1,330	1,043	3,610	61.1	611	114	102	19	28	215	22	532	604	432	223	447	167	608	287	156	18	55	
Mercer	2,483	1,390	1,042	2,521	2,696	7,132	96.4	964	253	309	63	102	452	71	1,162	1,781	1,053	651	627	266	1,165	574	274	49	133	
Middlesex	2,097	1,263	997	2,798	2,143	8,295	125.2	1,252	228	222	43	101	572	23	1,165	1,300	679	665	606	361	619	474	223	36	92	
Monmouth	2,214	1,156	906	2,560	2,634	7,210	107.1	1,071	183	7	146	102	442	32	1,163	1,309	943	549	716	394	613	508	212	60	99	
Morris	1,540	1,017	807	2,543	2,383	5,927	161.1	1,611	167	1	237	67	386	46	697	1,068	959	492	533	230	1,101	444	183	66	116	
Ocean	405	234	184	672	624	1,695	12.3	123	63	1	32	21	65	12	195	302	191	123	116	46	186	149	48	9	23	
Passaic	4,171	2,693	1,546	4,271	2,790	11,401	218.3	2,183	344	42	606	114	571	67	2,174	2,311	1,778	1,417	830	561	364	718	358	46	190	
Salem	856	423	266	953	1,165	2,610	45.1	451	136	8	44	10	191	26	412	596	372	128	196	116	247	212	96	10	26	
Somerset	722	291	402	1,153	1,394	3,261	70.6	706	61	3	83	50	201	25	333	534	415	169	302	180	453	269	123	30	44	
Sussex	476	206	303	634	1,092	2,277	66.9	669	91	66	7	20	112	18	210	461	306	169	255	108	315	166	66	12	44	
Union	2,866	2,994	1,681	3,165	2,431	12,137	197.3	1,973	306	9	271	68	104	46	1,219	1,425	1,278	900	672	346	789	480	232	35	102	
Warren	1,153	749	565	1,649	1,535	5,651	67.1	671	135	11	213	25	269	33	302	690	513	304	543	193	498	312	112	23	71	
Totals	53,494	30,136	21,974	69,485	48,047	213,136	289.4	2,894	5,797	712	6,106	1,355	1572	12,808	1,013	31,326	24,303	17,629	13,121	7,399	14,659	10,933	4,329	756	2,454	

Total deaths in the State, for ten years (including supplements), was 280,708, and the average death-rate 19.16.

Rates for short periods, or which deal with small numbers, are only approximate and sometimes misleading, since temporary causes may have been in operation, and small numbers do not eliminate or balance errors which practically disappear in large aggregates. So, five or ten years' analyses are much more important than any single year. The number of deaths before twenty, in proportion to the rest, is much more informative as to local causes affecting health, than the total deaths. See, also, the number dying from zymotic diseases, and especially from fever, erysipelas, diphtheria, diarrhoeal diseases, consumption, and brain and nervous diseases of children.

REPORT ON VITAL STATISTICS.

Summary of Vital Facts from New Jersey Death Record, in Cities of over 5,000 Population, for Ten Years ending June 30th, 1888.

CITIES HAVING OVER 5,000 POPULATION	DEATHS AT ALL AGES						PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty	Total, including un- defined.	Population, census of 1880.	Death-rate per 1,000.	Hemiplegic fever, &c.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption.	Acute lung diseases.	Brain and nervous dis- eases of children.	Diseases of heart and obstruction.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intesti- nal diseases.	Cancer.	Acute rheumatism.	Puerperal.
Atlantic City	469	232	143	463	257	1,564	10,000	156.4	10	19	1	26	2	15	68	18	254	167	101	189	118	76	126	79	33	6	18
Bordentown	144	96	79	313	259	891	10,000	89.1	10	19	1	20	2	7	31	5	65	161	42	64	74	35	97	66	22	3	12
Burlington City	290	196	140	444	396	1,666	10,000	166.6	20	31	3	15	3	14	112	10	141	230	134	54	104	69	134	90	32	9	19
Camden City	2,512	1,412	1,031	2,366	1,552	9,273	10,000	927.3	99	283	150	226	24	72	202	19	1,242	1,242	816	760	207	254	619	312	178	20	68
Gloucester City	287	143	129	345	159	1,063	10,000	106.3	6	33	...	22	6	10	57	1	134	199	73	66	45	24	70	41	13	8	15
Bridgeport	374	234	147	433	307	1,491	10,000	149.1	9	54	...	26	4	15	114	10	190	257	163	112	111	48	103	91	29	2	10
Millville	379	287	183	396	246	1,491	10,000	149.1	8	84	...	45	18	14	126	6	224	288	145	97	71	43	75	66	23	4	11
Newark	8,426	5,813	3,296	11,376	5,551	34,462	10,000	344.62	300	280	37	1,073	219	254	2,574	134	3,410	6,173	3,952	3,124	1,941	1,941	2,240	1,419	736	78	244
Orange	720	480	262	988	427	2,877	10,000	287.7	14	56	...	79	22	23	161	17	321	453	294	244	150	122	142	118	61	7	83
Bayonne	713	495	201	677	216	2,397	10,000	239.7	34	60	...	26	17	20	109	12	309	310	206	262	26	59	60	40	26	7	31
Harrison	382	277	193	517	166	1,535	10,000	153.5	52	67	...	29	9	16	112	2	180	325	175	198	45	81	75	45	24	7	30
Hoboken	2,353	1,578	728	2,663	836	7,158	10,000	715.8	88	163	20	174	57	45	663	45	1,259	1,070	690	963	451	289	354	267	151	21	36
Jersey City	8,207	6,073	3,216	10,382	3,918	31,906	10,000	319.06	381	650	254	1,218	284	261	2,045	104	3,350	4,062	4,003	2,774	1,460	922	1,328	1,800	623	82	346
Town of Union	524	336	200	461	191	1,712	10,000	171.2	28	40	4	61	17	9	226	4	259	202	162	165	91	38	70	61	25	2	22
Chambersburg	392	200	140	393	183	1,308	10,000	130.8	10	31	...	49	20	13	74	6	190	201	131	87	62	34	75	51	34	4	28
Trenton	1,422	842	549	1,910	1,204	5,927	10,000	592.7	61	136	19	171	44	56	326	24	668	963	664	379	207	108	456	292	120	26	69
New Brunswick	837	488	425	1,015	749	3,514	10,000	351.4	28	98	9	78	18	46	259	15	474	615	317	235	200	165	213	168	113	12	23
Perth Amboy	140	75	54	121	49	340	10,000	34.0	5	6	...	5	5	2	47	1	67	57	41	46	14	11	23	13	5	3	8
Long Branch	48	20	24	72	46	160	10,000	16.0	4	5	...	1	...	3	21	1	47	37	17	15	12	10	25	26	8	1	2
Morrisstown	226	153	102	451	306	1,234	10,000	123.4	19	30	1	12	1	11	69	4	151	215	111	75	84	59	191	77	40	6	13
Parsippany	473	275	157	416	212	1,523	10,000	152.3	14	59	...	94	13	13	88	8	242	193	162	160	73	61	78	68	17	12	20
Paterson	3,457	2,256	1,233	4,025	2,161	13,132	10,000	1313.2	145	269	42	357	110	92	626	31	1,763	1,919	1,432	1,139	655	461	663	576	244	50	153
Staten City	232	115	91	250	274	962	10,000	96.2	15	30	3	7	...	10	52	1	105	161	96	48	49	26	84	60	37	7	9
Elizabeth	1,603	1,023	644	1,777	1,076	6,123	10,000	612.3	101	90	4	123	23	72	431	20	757	756	628	655	349	168	296	269	114	14	319
Plainfield	368	193	132	384	381	1,568	10,000	156.8	13	31	1	31	10	9	66	5	209	206	167	99	85	70	118	57	31	8	10
Rahway	236	143	106	404	371	1,260	10,000	126.0	18	25	3	42	6	8	33	10	102	209	169	90	96	38	112	64	31	3	11
Phillipsburg	372	208	148	353	224	1,205	10,000	120.5	3	35	1	46	7	9	94	8	133	157	112	124	60	29	99	71	20	5	12
Totals	130,752	23,645	13,770	44,393	21,927	214,487	10,000	214.487	10,456	566	4163	970	1101	9193	648	17,257	19,567	16,365	12,378	6599	4604	4325	5920	2702	291	1632	

Cities are generally more unhealthy than their death-rates indicate, since the population in many of them much decreased for four months in the year, and thousands remove themselves instead of removing the evils which distress and sicken those who remain. Hence in many of our cities the death-rate for June, July, August and September, reckoned for the remaining population, is a fair criterion of the health of locality, or at least should be considered for purposes of correction. So, health laws are a great defense to all, but especially to the working classes of cities. It is a question of labor and social science and art, as well as of comfort and hygiene.

**SYNOPSIS OF VITAL RETURNS AND COMMENTS
ON PRINCIPAL DISEASES.**

The following outline presents the comparative number of marriages, births and deaths, as follows :

Average for five years ending June 30th, 1883 :

Marriages	8,539
Births	24,281
Deaths.....	21,981

Number in the year ending June 30th, 1884 :

Marriages	8,968
Births	25,263
Deaths.....	21,716

In the year ending June 30th, 1885, to be reckoned on an increased population of 146,917 :

Marriages	8,989
Births.....	24,077
Deaths.....	23,807

Year ending June 30th, 1886 :

Marriages	12,351
Births	25,497
Deaths.....	22,734

Year ending June 30th, 1887 :

Marriages	15,416
Births	27,340
Deaths.....	24,331

Year ending June 30th, 1888 :

Marriages	16,025
Births	28,074
Deaths.....	27,173

Average for five years ending June 30th, 1888 :

Marriages	9,664
Births	26,050
Deaths.....	23,952

Average for ten years ending June 30th, 1888 :

Marriages	9,101
Births	25,165
Deaths.....	22,966

Of the marriages since 1885, the following numbers are recognized as of couples out of the State, and are not reckoned in any computation :

1886.....	2,527
1887.....	4,332
1888.....	4,557

For the year 1887-88, we find that of the 27,173 deaths occurring, 6,534 were under one year of age, 3,974 were between one and five years of age, and 2,605 more died between five and twenty years of age. Of those under one year, 1,770 died under one month. In addition, the still-birth return would add 1,739.

In the last report, deductions are made from similar facts, which do not need to be here repeated.

GENERAL REMARKS AS TO THE YEAR.

It is always a matter of serious reflection when the death-rate of any State or portion of the State is not diminishing. With all the allowance that is to be made for increase of population since 1885, it is evident that the number of proportionate deaths is greater. It is not so in the best-situated rural districts. The comparison of localities, of country and city, and of cities with each other, does not fail to show how artificial and local are some of the causes. They are not hard to trace. Among them, overcrowding stands pre-eminent. It is a more prevalent cause of sickness than impure water. Philadelphia, with some marked evils, from the fact that it averages only about five persons to a house has been able to keep its death-rate on an average with many other cities. On the other hand, the large population about New York city have a large tenement population, and often narrow streets and few parks. Valuable contrasts can be

drawn between such cities as Jersey City and Plainfield, or Newark and Orange. No one can study these statistics as recorded from year to year, without seeing how artificial is the shortening of human life. A death-rate of 26.82 in Hudson county and of 11.65 in Sussex county means something more than mere location.

It is a favorite hypothesis with the citizens of almost every city that their death-rate is overstated. Always a year or two after a census the growth is overestimated. Lately, we heard it claimed that the reckoning was excessive because undertakers returned to City Clerks deaths that took place outside of city limits. That is true, but the law provides that they shall be returned to the Assessors of townships. Even where they are not, when they come to this office they find record in the locality named in the certificate of death.

It is forgotten, too, that in all our large cities thousands leave for the most unhealthy months, and so all of our reckonings for such cities fall short of the death-dealing capacity thereof. This is shown by the mortality that does prevail among those that remain. In many cases this, reckoned on the basis of the actual resident population at the time, would give a much larger number per thousand.

If an office like this could be subject to any tendency or prejudice it would be to minimize the death-rate, and so show the rapid value of sanitary measures. While we have a system of return that every year is demonstrating its excellence, yet it is inevitable that some cases will escape return. After a full consideration of the facts and figures, and of all disturbing incidents, we find but two places in the State in which the death-rate is above the actual evidence as to locality. These are Atlantic City, where the floating population is so comparatively large and where invalids resort, and North Bergen township, Hudson county, in which all the county institutions are located. So far as possible, institutional returns are noted. By the last Registrar-General's report for England and Wales (1887), we find the mortality to have been only 18.8 per 1,000, and that for London but 18.5. Although this was the lowest on record since 1837, the death-rate of 19.2 per 1,000 of the estimated population for 1888 in the twenty-eight larger English cities seems to indicate a lower record for the whole country. That of London for 1888 is 18.6.

We thus see what a vast opportunity we have for improvement. It is well recognized that England owes this result largely to its more thorough, extended and exacting sanitary methods. The gov-

ernment has come to know that it pays to diminish the sickness and preserve the lives of its people by large expenditures for great sanitary improvements. This State has made some marvelous advances for the past ten years, but they should be four-folded before the twentieth century dawns. The work is chiefly that of Local Health Boards and other local authorities. Located as the State is and increasing in population as it is, we are sure to have increasing death-rates, unless we put ourselves upon the preventive basis and on a far more liberal and radical scale.

Inspectors must be better educated, better paid and held to more strict account of their work. They must be greatly increased in numbers. Some of our Boards in small towns have shown what a faithful Inspector can do in limiting disease and in securing better sanitary conditions.

PRINCIPAL DISEASES.

REMITTENT FEVER.

The total of deaths from this cause for the official year is 264. The average for the past ten years has been, per year, 289. An examination of each yearly record shows some diminution with the exception of those years in which some special climatic influences seem to be in operation. There can be no doubt as to the relation of moisture and of wet and undrained lands, and abundance of vegetable matter, to the whole class of malarial fevers. Much depends upon the circumstances under which this vegetable matter is undergoing decomposition—upon its amount and the degree to which it is being appropriated by growing vegetation. There is a law of natural change quite in accord with health. On the other hand, there are forced, unnatural and profuse decompositions which outreach the adjusting and compensating and appropriating powers of nature, and so produce the materials for human disease. The evidence that the malarial microphyte or micro-organism of Loveron is related to its causation seems to be confirmed by the more recent investigations of Osler, Carter and Councilman. Whatever may be this relation, it in no wise diminishes the importance of removing the great fertilizing localities of these low forms of vegetable life. Results such as have been secured by the removal of mill-dams at Rahway and Bound Brook, by drainage in and about

Burlington, and by the drainage of the Pequest valley, in Warren county, give promise of greater gains when such improvements are fully followed up and new accumulations not permitted. It is cheering to know that the efforts of the Geological Survey, the Board of Agriculture and of this Board, as to the drainage of the upper Passaic, have resulted in securing the co-operation of the owners of the mills at Little Falls, and that already the "Great Piece" of drowned lands beyond Caldwell is being drained under the direction of Messrs. Harrison, Blauvelt and Howell as Commissioners.

Hudson and Essex counties suffer most from malarial diseases, and there is much need of great attention to this matter in various localities.

TYPHOID FEVER.

The total of deaths reported therefrom for the statistical year was 620. The average for the last decennial period has been 579 per year.

Its specific character is well known, as well as some of the laws of its production. Professor Brouardel, of the Faculty of Medicine of Paris, in a paper in the September 26th and October 2d, 1887, numbers of the *Revue d'Hygiene*, speaks thus: "I wish to demonstrate that the agents for the propagation of this disease are the water we drink, the air which we breathe, soiled clothing and the hands of the nurses.

* * * To-day it is possible to assign to each of these means the share which belongs to it." He then gives the evidence as to water being the great conveyancer.

As to air, beginning with Murchison's case (1828), he quotes various cases and authorities since to date to show its conveyance by the air, but that in each instance the air was saturated with moisture.

He shows that distribution by the hands or contact with clothing is rare, and concludes, as a whole, that water is the distributor in 99 cases out of 100. Prof. Roch, in a recent address before the College of Military Medicine, considering the relation of soil, air and water to the development and diffusion of micro-organisms, says that moisture is essential for their multiplication and development. "So, air contains much fewer microbes than water, and is thus a less favorable medium for the spread of infective material than fluids, especially as air distributes mostly only those microbes that can exist in the dry state."

This, next to small-pox, ought to be the most preventable disease.

Nothing less than indignation should be expressed against polluted water-supplies. They are a constant menace to public and personal health. They are to be guarded as we would guard the citadel of life, for too often they are the general distributors of disease, and only await some specific poison in order to become the draught of death.

Typhoid fever is especially a disease of large cities, or of counties in which the population is dense. Hudson county reported the last year 179 deaths from this cause, and Essex county 92. The number for Hudson county is especially large. In Jersey City alone there were 114 deaths therefrom, while Paterson, with more than one-third of its population, had but 21. While the number of cases in a single year may be excessive from some temporary cause, yet a large decennial average is the certain evidence of failure in proper provisions for sanitary administration and police.

But typhoid fever is not only a disease of cities. Sad cases occur like that near Franklin Park, in Middlesex county, where a case originating in another place, by reason of some oversight, proves the center of infection for a family or a neighborhood—generally by reason of the pollution of the well-water.

In Burlington county we have facts that show that the disease occurs too frequently in country villages and separated farm-houses. Thus, at Medford, Smithville and some other points there have been cases one after another in succession, and sometimes mild endemics. Dr. Hollingshead, of Pemberton, who practices over quite a large section, says it is no year absent, varying in numbers and severity. Dr. Stokes, of Moorestown, reported thirteen cases. Drs. Page and Van Mater, of Columbus, had twenty cases. Dr. Gauntt, of Burlington, claims that both it, diarrhoea and dysenteries are too frequent in the county, and attributes it to the habit of having the well in an adjoining shed, around which much washing of pans, &c., is done, and where slops are often thrown. My own study of the statistics and my conversation with physicians of that county, lead me to believe that there are even more cases of this disease than are represented by the death-rate. We beg to insist that typhoid fever should be more closely studied with a view to its prevention by purity of water-supply, isolation, disinfection, &c.

SMALL-POX.

The deaths from small-pox have only been five. The average of deaths therefrom for ten years has been seventy-one. We owe this exemption to vaccination, to the greater care of school boards and to the prompt action of local health authorities as to isolation and other aids.

If only some other diseases more common and fatal, equally alarmed the people, and if only the same methods of isolation and disinfection were promptly used, we should have some similar results. Every year emphasizes the need of vaccination. Recent facts seem more fully to impress the need of revaccination after twelve years of age. (See article on Vaccination, in Secretary's Report herewith.)

The unfortunate essay of Dr. Creighton, furnished to the Encyclopædia Britannica, has been so fully criticised as to show that it is not sustained by facts. Although recognizing the great value of vaccination, it magnifies certain limitations beyond their true value. While it is true that we do not have compulsory vaccination, our law does claim that all children who have never had the small-pox or been vaccinated, may be excluded from attendance at public schools whenever cases occur in the city or district.

SCARLET FEVER.

The mortality from scarlet fever for the statistical year was 574. That for the ten years gives an annual average of 610. It threatened an epidemic at Englewood, but the Board of Health applied to it the methods of isolation and disinfection used in small-pox, and much limited the spread. Hudson county reports 140 deaths therefrom, and Essex county 44. The special excess was in Passaic county, which recorded 181 deaths, of which 172 were in Paterson. No new facts have been developed as to its contagion. The claim of Messrs. Powers and Kline that it is a disease occurring primarily in cows and so conveyed to mankind, has been so controverted by Profs. Crookshanks and Brown that it meets with less acceptance.

More attention than formerly is now given to all throat conditions. The doctrine of the microphytic origin of disease indicates to us that most of the contagions are received by breathing, and first come in

contact with the throat. Some of them are certainly local before they are constitutional. In our tenth report (1886), pages 37-40, we gave some important facts as to the lymphatic tissue of the tonsils, fauces, &c., and the ready susceptibility of this region.

"Since Stöhr has shown that the epithelium of normal tonsils presents openings, stigmata or holes through which white blood corpuscles pass constantly into the mouth, the way is open directly to the blood for the passage of outside germs." So, whether at first local or constitutional, this is the great port of entry for the "*contagium vivum*." It is for this reason that we have long urged the greatest care of the mouth. Let not a bad breath be the invitation to or the soil for the particles of disease. Keep the mouth shut in presence of concentrated contagion. Let the throat be protected on its surface from this readiness for absorption. We believe that this explains why condiments, iron, quinine, potassium chloride, &c., by frequent use in small quantities, seem to be aids in withstanding contagion, as well as, perhaps, the presence of these antiseptics in the blood. The cleansing of teeth and the rinsing of the mouth are important as aiding in protection against contagion. The following points to which Dr. Wetherill, of Trenton, draws attention, in connection with interesting clinical details of some cases in his practice, are worthy of note.

"1. Scarlatina often deviates from the true type, as we know it, and may be so masked as to resemble another disease so closely as to make the differential diagnosis very difficult, or even impossible, in its early stages, and sometimes in any stage. 2. The danger of contagion from these cases is increased greatly, and the fever contracted in this way may be of a severe and fatal kind, so that, 3, this is a disease we should exercise unusual care in detecting and quarantining. 4. The disease may be inoculated when the virus has access to the blood, and more than ordinary care in cleansing instruments such as the tongue-depressor and thermometer is required, and there should be thorough disinfection before their use in any surgical operation. The same disinfection is necessary also before obstetrical cases are attended. 5. Careful and frequent examination of the urine for albumen, epithelium and casts is a valuable diagnostic measure, and may forewarn the attendant of approaching danger of uræmia, and may save a sudden fatal termination of the case when it is supposed the patient is convalescent."

MEASLES.

Deaths from this disease were comparatively few the past year and quite in contrast with the excessive record of the former year. Seventy-four fatal cases are reported.

The average for the last ten years was 135 per year. As the great danger is from bronchial and pneumonic complications, much depends on the care exercised during the sickness and convalescence. The influence of climate and weather upon the disease is very marked. It is a very persistent and spreading contagion—perhaps the most so of all the communicable diseases, save small-pox. It is a good disease for the study of the bacteriologist, although no microphyte is yet authenticated.

WHOOPIING-COUGH.

The year's death-record for this is 161. The ten years' average is 187. Elizabeth reports fourteen cases, an unusual mortality. The one point as to its spread which needs to be emphasized, is that the dried sputa convey the disease except in the presence of abundance of good air. The spasmodic cough often gives rise to other nervous affections. Parents are too apt to make light of severe cases, because often the child seems comfortable in the intervals of paroxysm.

DIPHTHERIA.

This continues to be the most formidable and fatal of the ordinary communicable diseases.

Two thousand and thirty-six deaths are reported from this cause. The average for the ten years has been 1,280.

Hudson county reports 473 deaths, of which 285 were in Jersey City. Essex county reports 456 deaths, of which Newark had 397. Orange, at the same rate, would have had 170 instead of 17.

It was persistent and fatal at Lyons Farms, Essex county, and Millville, Cumberland county.

At Elmer, in the same county, out of twenty-eight cases there were fourteen deaths.

It was prevalent in various localities throughout the State.

Diphtheria was first separately returned in the English Registrar-

General's reports in 1855. It was first separately returned for London in 1859. It first seemed to be a disease more marked in the rural than in the urban districts. Yet the statistics since 1855 show that there are two special diphtheritic areas in England and Wales—the southeastern area, consisting of London and of eleven surrounding registration counties, and the western or Welsh area, consisting chiefly of North Wales and Shropshire. During the last seven years—1881–7—the rate of mortality from diphtheria in London has exceeded the mean rate in the whole of England and Wales; for these years the mean annual rate was 217 per million. Thus, as here, the claim of its being a rural disease has been modified, and yet its spread seems quite as marked in small villages as in larger cities.

The views presented by the Secretary in a special circular addressed to the physicians of the State, 1887, as to the need of more care on the part of physicians as to the details of isolation and disinfection, are fully sustained by increasing numbers of facts. It cannot be concealed that, as elsewhere, there is a great difference as to sanitary practices. One physician treats his case, but seems not to be as skilled and exact in dealing with all disturbing influences. The other turns his attention also to the details of sanitary care of premises and surroundings, and either sees that they are properly attended to or sends for the Sanitary Inspector. For two successive years the Board of Health of Michigan has traced results. As to the results in 1886, Dr. I. Lewis Smith, of New York, comments thus: Dr. H. B. Baker, Secretary of the State Board of Health, Michigan, has published statistics showing that in 102 attacks of diphtheria, the average number of cases where disinfection and isolation (either one or both) were neglected was 16, and the average of deaths 3.23; while in 116 outbreaks in which isolation and disinfection were enforced, the average number of cases per outbreak was 2.86, and of deaths 0.66. These precautionary measures, therefore, prevented 13 cases and 2.57 deaths for each outbreak, or, in the total, 1,545 cases and 298 deaths in the year.

In the abstract of proceedings of the Board, October, 1888, Dr. Baker thus states the results for 1887:

RESULTS OF WORK TO PREVENT DIPHTHERIA IN 1887.

“In those outbreaks of diphtheria in Michigan in 1887, where the recommendations of the State Board of Health as to isolation and disinfection were fully carried out, there were only about one-fourth as many cases and deaths as in those outbreaks where these measures were not taken. Compared with those outbreaks in which either isolation or disinfection or both were neglected, there was, in the 78 outbreaks in which isolation and disinfection were both enforced, a saving of 160 lives and 721 cases of diphtheria. Although this is a record of a saving of human life of which those officers who contributed to it should be proud, yet the saving of life in Michigan during the year 1887 from this disease was undoubtedly much greater than is shown by such a comparison, because, if in each of the 398 outbreaks reported there had been as many cases and deaths as there were in each of the 118 outbreaks in which either isolation or disinfection or both were neglected, there would have been 1,079 deaths and 4,692 cases. So that, without counting the saving which probably occurred in outbreaks in which only one of the essentials (isolation and disinfection) was neglected, there is indicated a saving in Michigan in 1887, from this one disease, diphtheria, of 518 lives and 2,371 cases of sickness.

“The evidence of the experience in 1887 is all the stronger because it is in harmony with the facts previously reported, relative to the year 1886. It is to be regretted that in 202 outbreaks the health officers' reports were not sufficiently definite to make it certain just what was done; but there is cause for congratulation that the local work by those health officers who made these imperfect reports was apparently better than their reports, because if in each of these 202 outbreaks there had been as many cases and deaths as in each of the 118 outbreaks in which isolation or disinfection or both were known to have been neglected, there would have been 357 more deaths and 1,650 more cases than was reported to have occurred. The table, exhibiting the facts, is as follows:

DIPHTHERIA IN MICHIGAN IN 1887.

Table exhibiting the average number of cases and deaths reported per outbreak—in all the 398 outbreaks reported; in the 202 outbreaks in which it is doubtful whether or not disinfection or isolation was secured; in the 118 outbreaks in which isolation or disinfection or both were neglected; and in the 78 outbreaks in which isolation and disinfection were both enforced. Compiled in the office of the Secretary of the State Board of Health, from reports made by local health officers.

	(398 outbreaks)		Isolation or disinfection not mentioned or statements doubtful. (202 outbreaks.)		Isolation or disinfection, or both, neglected. (118 outbreaks.)		Isolation and disinfection both enforced (78 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals	2,321	561	732	190	1,391	320	198	51
Averages.....	5.83	1.41	3.62	.94	11.79	2.71	2.54	.65

Prof. Oertel, of Munich, well known for his former studies of diphtheria, has made, the past year, a very important contribution to its histiology, and one bearing on its treatment. It seems to prove it to be in its start a local disease, and so we have emphasized the value of very early local and systemic treatment. But it is also shown how soon local treatment becomes secondary. The following editorial of the London *Lancet* is commended to the notice of physicians :

“The recent elaborate inquiry of Professor Oertel, of Munich, of which we have given an account in these columns, seems to have advanced our ideas upon the nature of the disease one step, although it leaves its etiology still in obscurity. It is true, doubtless, that the conclusions at which Professor Oertel has arrived are much the same as those which are now generally held; but his great merit lies in this—namely, that he has given such conclusions that basis of fact which was heretofore lacking. We have, therefore, now a clearer insight into the nature of the morbid process, and can with greater confidence deal practically with the disease. The main outcome of Professor Oertel’s work is as follows: Diphtheria is a disease which is excited by a specific contagium. This contagium—by analogy rather than from absolute demonstration—is of bacterial nature. The

implantation of the contagium upon a mucous membrane, usually that of the fauces, leads to changes commencing in the surface epithelium. It is inferred that the virus, probably a ptomaine, at once acts upon the mucous membrane, exciting inflammation, as shown by the leucocytal infiltration that occurs. The leucocytes themselves become attacked by the virus, and undergo remarkable changes which lead to their disintegration. These changes, which have been so exhaustively studied by Professor Oertel, are marked by abnormal cleavage and chemical alteration of the cell-nuclei; they eventuate rapidly in the formation of areas of necrobiosis in the substance of the mucous membrane. The diphtheritic false membrane is therefore but part of a process that involves the whole mucosa. The lymphadenitis in connection with the altered mucous tract is strictly specific, for the glands show the same changes as to necrobiosis as the membrane itself. Similar lesions, but less intense and numerous, occur in the intestine and the mesenteric glands, and also in the spleen; but in other viscera the lesions are referable to inflammatory reaction rather than to the essential phenomena of the disease. The study is a demonstration that diphtheria is at the outset a strictly local disease, but that in a few hours its poison spreads in the part first affected and in its vicinity; and in a few days it may enter the blood in such amount as to produce the most marked evidence of systemic poisoning, which, if not causing death from its effect on the heart or other vital organs, may in due course produce peripheral neuritis, and perhaps myelitis.

“Diphtheria, then, is not in the first instance a systemic poison; it is local. Just as in syphilis the attempt has been made to prevent the constitutional malady by excision of the local contagious sore, or in hydrophobia by excision of the bite-wound, so in diphtheria it might be thought that the disease could be arrested by dealing with the local manifestation thoroughly. This conception has been largely put into practice from the earliest days of the history of diphtheria, and the false membrane has been ruthlessly destroyed only to re-form. This period of the violent escharotic or other means of removal of the false membrane must be closed. Milder solvents are applicable; but, if Professor Oertel be correct, the object they aim at is unattainable. The membrane may be dissolved and detached, but the disease is not cured; for the membrane is only the surface indication of a deep-seated and widespread change. Nevertheless, it is well to minimize the risk of the extension of the disease by contagion within the body by the free disinfection of the pharynx. As for other treatment—for we have no antidote for the diphtheritic poison—reliance must be placed upon nutrition being maintained.”

ERYSIPELAS.

Erysipelas records 128 deaths, the yearly average for the ten years being 101.

There is a growing recognition of the specificity and of the communicability of this disease. Not only is much to be done by active medication at the start, but all sanitary conditions are to be attended to. The relation of the malignancy of some epidemics to filth conditions is fully recognized.

The gravity of the disease is all the more serious because of the special susceptibility of women after labor and the sad losses of mothers that it thus too often causes. The subtle poison may be carried by doctors or nurses unless the most scrupulous asepticism is exercised.

DIARRHOEAL DISEASES.

Three thousand five hundred and eight is the record of deaths from this cause the past year of those under ten years of age. The decennial average has been 592. It is worth while for every city to study closely the proportion of these deaths to the number of children living under this age, the localities, by wards or sections, where they occur, and the deviations from ordinary diarrhoea which show themselves in cholera, cholera infantum, or some other form resembling epidemicity. It is always to be remembered that the number of deaths from this disease and from the communicable diseases is far more indicative as to local conditions than a general death-rate. Also, that the mortality is not near as great as most cities are capable of causing, because of the migration of so large a number of citizens with their families during the heated term. It is difficult to select out in all cases the operating cause, but a close study of statistics of various years and large populations points to overcrowding, foul air, impure water and unfit foods as the operating causes.

CONSUMPTION.

The record of the past year is 3,358, 1,723 being males and 1,635 females. The total average for the ten years is 3,182.

Besides the specific character of the disease, it is to be remembered

that lung diseases represent a great variety of causes. Sudden variations of climate, exposures in trades and various industries, measles, overcrowding, in fact almost any condition or disease which is depressing and debilitating tends to make impression upon the respiratory centers and tissue and to interfere with that process which, beyond all others, is indispensable. The influence of climates and occupations is now being studied as never before, with the hope that something may be done to diminish the inroads of so destructive a disease.

ACUTE LUNG DISEASES.

Our record for the year is 2,922, and for the ten years a yearly average of deaths of 2,438.

Pneumonia especially seems to be on the increase. It is at times so prevalent that in the forms of typhoid pneumonia it is claimed to be endemic. Yet there are no pathological conditions to distinguish it. Strong claim is made of its being due to or accompanied by the presence of a specific microphyte or micro-organism. It frequently results from unwise change of clothing, as when persons dress for an evening entertainment, or from imprudent exposure or improper management just after them. The influence of the foul air of assembly-rooms and the sudden change on coming out, or of confined foul air from any cause, is not to be overlooked. The writer is strongly under the impression of suffering from an attack brought on by such exposure in the vaults of the Camden jail. The whole question of factory labor also needs to be studied in the relation of various dusts and of errors in heating and ventilation to these various lung diseases. While bronchitis is the more common manifestation, pneumonia or consumption often results.

BRAIN AND NERVOUS DISEASES OF CHILDREN.

Of deaths from this class of diseases, 1,971 are reported for the statistical year.

The yearly average for ten years was 1,762. There are many varieties in these diseases, but among children they too often stand for some form of hereditary impairment, or for exposure to influences that tend to enfeeble the nervous system. There is a much larger proportion of these diseases in cities. School life is recognized as

producing or developing much disease of the nervous system. Often imperfect nourishment, foul air, and overpressure in studies so breaks down the nervous system at an early age as either to destroy life or to produce permanent limitation of vital force. Even the number of deaths fails to express the amount of damage done. Children need to be recognized as animals far more than they are, and, at least, to be given all the chances for vigor that a stock-raiser would give to his registered stock. How different is this from the reality! We desire especially to call attention to the need there is in our American civilization of giving the most thorough attention to the hygienic care of childhood.

DISEASES OF THE HEART AND CIRCULATION.

The record of deaths for the year is 1,691. The yearly average for ten years is 1,313.

It is believed that by reason of improvements in the treatment of acute rheumatism, heart disease from this cause is not so common as formerly. But this diminution has been more than made up by the excitement of this age, by stress and strain of modern occupations and sometimes of modern exercises. Alcohol and tobacco are still making great inroads upon the circulation. The use of the word "heart-failure" as a cause of death has become very common, but has no more real meaning than to say a person died for want of breath. It is a mode of death, and not a cause of death.

RENAL AND URINARY DISEASES.

Disorders of the great cleansing or emunctory system are always fraught with danger to health and life. Deaths from these causes the past year number 1,020. The average for ten years being 753.

It is sometimes forgotten that more solid matter in the form of urea, &c., is removed by the kidneys each day than by any other one system. Sudden exposure to severe alternation of temperature, the excessive use of alcohol, cayenne pepper and other condiments disturb and irritate the minute circulatory system of the kidneys, and we have as a result various forms of inflammation and consolidation, interfering with normal action. As the retention or too slow elimination of urea from the blood is the retention of a poison, it is no

wonder that many of the cases of heart disease and brain disease have their start in the imperfect action of the renal system. In our office tables we distinguish between renal and urinary diseases as far as possible, although the certificates do not always make these plain.

ADULT BRAIN AND SPINAL DISEASES.

The returns for the year show 2,095 deaths therefrom, the yearly decennial average being 1,405 deaths. Besides some increase, perhaps the most noticeable feature is the comparatively early adult age at which so many deaths from apoplexy, paralysis, &c., occur. Now that we have come to know that so many asylum cases are due not to original disease of the brain or hereditary taint, but to some form of systemic derangement, worry or overwork, we should remember that the 2,600 in our asylums stand for very many more who are approaching similar conditions or have averted them by a very narrow margin. There is no specific for such diseases, and so we need most to turn to preventive measures. Regular life in accord with the laws of health can alone diminish the death-record from these causes.

ADULT DIGESTIVE AND INTESTINAL DISEASES.

The deaths from these causes for the year are recorded at 1,476.

For the ten years the average has been 1,093. These stand as representatives of all forms of digestive impairment or incapacity, and so it is difficult to make accurate inferences therefrom. When, however, we come to deal with large populations through successive years and to contrast city and country, and to consider the alleged causes, we find that some light is thrown on the question of foods and drinks, and especially recognize that an over-indulgence, either in foods or stimulants, and in some cases too restricted diets, are alike unfavorable to longevity. With the various peptones and dietetic preparations, and with a more accurate knowledge of the functions exercised by various organs and parts of the intestinal tract, we are better able to suit treatment to the control of this class of diseases.

CANCER.

The death-record for the year is 612 and the yearly average for ten years 482.

The apparent increase of cancer has attracted the attention of the English and continental physicians, as well as those of our own country. Will it yet become a neoplasm like tubercle, and so add to the list of constitutional and critical diseases?

There is more reason to assume that the diagnosis is not always accurate, and that other forms of tumor are classified with it. It is certain that it should receive prompt attention, for the disease sometimes seems local before it is constitutional.

ACUTE RHEUMATISM.

The record of deaths from this cause the past year is 142. The decennial average being seventy-five.

No disease is more obscure as to its causes. While often excited by sudden cold, it is regarded by many as specific in its character. It is not to be confounded with various forms of myalgia and neuralgia, which, although allied in some of their symptoms, have none of its fevers or inflammations.

PUERPERAL DISEASES.

Two hundred and seventy-one deaths occurred from these, while the yearly average of the decennial record is 245.

This always stands for losses especially afflictive because of the removal of mothers who leave children that especially need their care and love. Some losses occur by reason of neglect in early attendance or by the incompetency of the person in charge. Subsequent fever also destroys many. There is less uniformity in these puerperal fevers than was formerly supposed, so that authors and practitioners are inclined to regard them as representing more than one contagium. But there can be no doubt that what is known as puerperal fever is often the result of indirect communication with some previous case. Hence, there is the greatest need of recognition of this on the part of attendants, and always of the most scrupulous care in exacting cleanliness and in all the details of the antiseptic art.

ACCIDENTS.

The number of deaths due to this cause is 1,320.

We do not always publish records of accidents, since these are so varied that they need to be studied in classes rather than in bulk. But any one familiar with returns is struck by the great preponderance of railroad accidents: Boiler explosions, imperfect machinery or undue care as to the protection from revolving wheels, belts, &c., cause many losses. When it is remembered that an accident is usually preventable, and that thus many of our most valuable artisans are lost, too much attention cannot be given to the protection of life and limb.

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THIRTEENTH ANNUAL REPORT
OF THE
BOARD OF HEALTH
OF THE
STATE OF NEW JERSEY,
AND REPORT OF THE
BUREAU OF VITAL STATISTICS.

1889.



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1890.

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REPORT OF THE SECRETARY OF THE BOARD.

To His Excellency Robert S. Green:

GOVERNOR—On behalf of the State Board of Health of New Jersey, I have the honor to present to your Excellency this, its 13th report. During all these years it has been our pleasure to witness the increasing recognition of the claims of sanitary science and art as subjects for governmental attention and oversight.

It has only been in more recent periods that there has been any adequate conception of the degree to which health and life are within the range and the duty of public as well as personal administration and control.

There are many risks to health over which the private citizen can exercise little or no restraint, and for defence from which he must look to the influence and direction of constituted authorities, and if need be, to the strong arm of the law.

It was a great advance, only made in this State in the past few years, when we came to have what may now be called a system of sanitary jurisprudence. The voice of the people and of the executive and legislative departments of our government has been sustained by such legal decisions as plainly affirm the propriety of large powers being committed to competent Boards of Health and the need of conferring powers of summary proceedings in order to enforce their ordinances.

Well may this be so. Statesmanship has no higher aim than the highest welfare of the whole people. How far the preservation of health and life from all avoidable limitations thereto, enters into consideration, let those tell whose effective labor and usefulness has been abridged by the restraints of disease. Or let the epidemic record it, which is only more significant because it fully acquaints the people with what is constantly happening as an individual or family misfortune. By the stagnation of business, the loss of property and the discouragement of life, it serves to make deep impres-

sion as to the extent to which we constantly need to be guarding the physical stamina, the hardy vigor and the industrial health of the people.

The general scope of this department and its possibilities of conserving general prosperity and happiness are far wider than most imagine. If to-day every household, every city, every hamlet of New Jersey could be put in the best sanitary condition it would be an achievement in the annals of peace as patriotic and as fruitful as any recorded in the triumphs of campaigns.

Even if we could reach the best status already attained by some of the most favored localities, we would be far in advance of our present record.

An outline of the great scope which the work includes is well presented in the following extract from Dr. John C. McVail, one of the best Scotch authorities :

“ The means for disease prevention which lie at the disposal of the modern sanitarian are both numerous and varied, and the value itself of the whole object of preventive medicine is but seldom called in question. Broadly speaking, we may take it that there are three great lines of defence, three groups of measures belonging to preventive medicine. These are sanitation, inoculation and isolation. Sanitation is the first line. The word is often used to cover both inoculation and isolation, but I wish to apply it here in a more restricted sense. Assuming the theory to be correct that zymotic diseases are due to specific organisms, we may say that the object of sanitation in this narrowed meaning is to produce such conditions of air, soil and water as shall not be consonant with the existence of these organisms. Such environment as is most suited to a human being is least suited to his microscopic foes. The first line of defence, in fact, is simply cleanliness—cleanliness in breathing, eating and drinking; cleanliness, personal, domestic and national. It includes many measures. It means that the soil on which we construct streets and houses shall be unpolluted, that the houses themselves shall be roomy and well ventilated, and that the air which ventilation provides shall itself be pure. It means that the water we drink shall contain no germs of cholera or enteric fever, and that our food shall be clean and wholesome. It means many legislative acts relating to pollution of rivers, to adulteration of food, to water supply, to bakehouses, to smoke abatement, to cattle diseases, to dairies and cowsheds, to factories and workshops, to open spaces, and to public health matters of many other kinds. This, then, is our first line of defence, and the question arises, Is it not in itself sufficient? Are all these laws and is all this cleanli-

ness not enough, in our own country at least, to exterminate zymotic diseases? Unfortunately experience answers No, for there are germs and germs. A few feet of pure air are enough to destroy the poison of typhus fever, while, if Dr. Hubert Airy be right, that of diphtheria may retain its vitality for several miles. Typhus fever, enteric fever and cholera may be taken as the best examples of enemies which are unable to pass our first lines of defence. The question as to whether this line will ever be rendered capable of eradicating such a disease as small-pox is hardly a practical one. I do not say that cleanliness has no power over it. The germs of small-pox will thrive better in a dirty house than in a clean one. But in the case of a disease, whose living cause seems to retain its vitality through a mile or more of London air, it is clear that in this country, with its enormous population, such air space as can be given in the best of model dwellings will be of little avail against this scourge. Whether a man's head, or his heart, or his liver be his weak part, he is strengthened and benefited by those sanitary measures which constitute our first line of defence. And be it noted that, valuable as are the second and third lines of which I am about to speak, it cannot be said of them that they directly protect against attack by any other than those diseases in special view of which they are undertaken.

The second line I have named *inoculation*, and I have done so advisedly, as indicating a theory rather than an actuality. If we describe the group of measures classed under the first line as consisting of means for preventing disease germs spreading and multiplying, we may describe the second group as a protection against germs which have succeeded in breaking through the first line. The second line is even less complete than the first. We have no inoculation to protect against scarlatina, measles or whooping cough. Against hydrophobia the line is in active formation. Against cholera it was tried with very doubtful effect in Spain two or three years ago. In fact, it is against only one disease that in past years this method of protection has been found capable of being made efficient. Fortunately, the disease in question—small-pox—is one against which there is very special need for protection, for there is none over which the first group of measures has less power.

"The third and last line of defence is isolation, the separation of the sick from the healthy. It has been said that the use of the knife is the opprobrium of surgery. In the same way isolation is the opprobrium of preventive medicine. Our first aim, as we have seen, is to prevent the existence of disease germs. Our second aim, which assumes that the first has been unsuccessful, consists in efforts to make the human body proof against the germs, to provide a coat of mail against an enemy that has broken through our defences. Our third aim

assumes that the enemy has got some of us by the throat, that part of our forces is in his grasp. I say, therefore, that isolation is the opprobrium of preventive medicine, and in all our work it is necessary to keep this in mind, that our main object should be to make isolation unnecessary by *preventing* any section of the population from being seized by disease, just as the main object of the surgeon should be to make operation unnecessary by the use of other and better means. But while it is true that the knife is the opprobrium of surgery, it is also true, paradoxical as it may appear, that some of the greatest triumphs of surgery are due to the use of operative measures. So also with us, some of the greatest triumphs of preventive medicine are due to timely isolation, isolation, that is to say, of the disease poison. For it is to be remembered that the isolation of the patient is simply a means towards the isolation of the poison. All methods of disinfection belong to this third line of defence—the burning of bedding, the fumigation of rooms, and so on, have for their object the destruction of a living germ whose existence we have failed to prevent.

These, then, are the methods of preventive medicines. We come next to the aims of preventive medicine and the objections that have been urged against these aims. For with regard to our whole procedure, the question of '*cui bono?*' frequently arises. To what end, it is asked, are all our measures for disease prevention? Are we not fighting against the great law of the survival of the fittest? In olden times, it is said, the weakly went to the wall, and only the strong lived, and became the progenitors of a healthy race, while now the weakly are nursed and coddled and protected against every wind that blows. The life, too, that these feeble ones live, is it worth living? Is it not simply one prolonged sickness, without either pleasure or usefulness? Nor do the consequences end with the sufferers. They marry and bring forth a degenerate race, the members of which also marry, and so by degrees the whole life blood of the nation is being poisoned. Thus it would appear that our title of health officers is a misnomer, and that our efforts after health only end in disease. In reply, it would be sufficient for the sanitarians to take up the high ground of the physician; to say that human life is a holy thing, and that it is his duty to preserve it wherever found. The physician may believe that the patient, whose life hangs in the balance, will, if he survive, be a curse to himself and to the world. Yet it is 'his not to reason why,' but to do his utmost to turn the trembling scale toward recovery. So it is not necessary for the sanitarian to discuss whether it is well or ill that the general environment of life be made such as to cause many a consumptive or scrofulous child to live that otherwise would die. It is his work to do all he can to make life easy of retention by the very weakest. If the question be asked, Where is the proof that our preventive measures—our sanitation, vaccination and isolation

—have had the result we speak of, the answer is at hand. It is given by the Registrar-General in the language of figures. He points out that, according to the newest English life table, the children born in England in any one year have now divided among them 'nearly two million years of life' more than would have been the case thirty five years ago. In England and Wales the annual mortality per 1,000,000 of population has been as follows: In 1861-5, 22,595; in 1866-70, 22,436; in 1871-5, 21,975; in 1876-80, 20,817; and in 1881-5, 19,310. Comparing the first period and the last, the difference is 3,285 per 1,000,000, and, taking the population at 30,000,000, the total annual saving is about 100,000 lives. And if for every death there are twenty cases of sickness, then we have 2,000,000 less cases of sickness than in the first period. Interesting calculations have been often made on this subject, and especially by that father of sanitation, Mr. Edwin Chadwick, who happily, is still with us, a witness of the greatness of the success that has attended his life's work. You can count the cost of each case of sickness, of lost work, of doctors' bills, and so on, and also the monetary value of each of the 100,000 lives saved. And you can put all this as income against the interest on the money spent in sanitary improvements—in water works, sewerage works, vaccination grants, officials' salaries, etc. And even on this lowest ground—on this merely commercial basis—we find that cleanliness, which is next to godliness, resembles godliness itself in being 'great gain.' But we can take a vastly higher standpoint. We also are laborers in the great field of moral reform. In this field there are many groups employed, each pursuing its own line, and each—ay, even the sanitarian—possibly apt to attach too much importance to his own particular department. The teetotaler holds that if intemperance were driven out of the land, then would follow education, cleanliness and religion. And, doubtless he is right. The educationist holds that if man's intellect were duly trained it would lead him to avoid alcohol, to avoid dirt, and to avoid immorality! Doubtless he too is right. The religionist holds that if man can be taught his duty to his God, he will do it also to himself and to his fellow-man, and that education, cleanliness and temperance will be the fruits of his religion. Again I say, doubtless he is right. And the sanitarian holds that if a man is provided with pure air, good food, and healthy exercise, he will then be in a bodily condition, which will produce no craving for the stimulus of alcohol, which will open his intellect to all the influences of education, and which will make him better able to receive and to appreciate the truths of religion. For, throughout our life, all good things are woven together, and thus it comes that the prosaic and oftentimes unattractive work of the sanitarian has in it an abounding helpfulness that overflows into every corner of man's being, and makes for his intellectual and his moral as well as for his physical welfare."

The time has really come when the State should be more aggressive in this work. This Board has maintained a conservatism which would have been culpable had it not seemed necessary until the people come nearer to an appreciation of the real needs. It has exercised an economy which would have been parsimonious were it not that it was attempting to lay firm and sure the foundations of a system rather than expecting to complete its details. During all the period, the appropriation has been about that provided to keep a single disease from among cattle and less than that to keep a single adulteration out of a dairy product. We take some of the blame to ourselves since the State has always responded when appropriation has been asked. But we invite our Legislature, and the people as well as ourselves, to consider whether the time has not come for a broader and more thorough health policy than has as yet been enforced.

It is not all, or chiefly in the direction of State appropriation. Should the people of thickly settled towns and cities, having a good water supply, be allowed to use so called family wells? Should large tracts of land, admitted to be in need of thorough drainage, be left to debilitate the people until the owners regard it as profitable to drain it? Should tenement houses, school houses and factories, which have relation to the State as well as to the locality, be left to the possible chance of some local ordinance? There are certain broad lines in which the State should itself enjoin. Gross neglects by cities are not bounded in their results by city limits. While the enforcement of ordinances should be committed to Local Boards, neglects on their part should easily reach the review of the higher courts. The time has at last come when laws and Boards of Health and the more intelligent public opinion should be found fully alive to the wide scope and beneficent possibilities of effective sanitary administration.

Our State has pursued a wise and liberal policy in the study of Economic Geology with a view of discovering and developing the material resources of all the land within its territory. There is an Economic Sanitation which is equally wise, and which should be provided for with a policy equally liberal.

Human life is a material resource and a well sustained condition of average good health has in it the material for economic success for the State as well as for the individual. When the air we breathe,

the food we eat, the water we drink, are properly guarded against contamination, when the arrangements and training in every school house are such as favor the best physical condition and development of the scholars, when our workshops are deprived of insani-tary influences, when proper inspection and plumbing secure healthy homes, and when there are proper public provisions for the prompt and proper removal of all decayable matter, there will be an addition made to the comfort, prosperity and material wealth of our citizens greater than can be derived from any other source. Every step in this direction is material progress and has its record in less disease and longer lives.

DRAINAGE FOR HEALTH.

Whatever may be the different views as to the precise relation of wet lands filled with decayable matter to the causation of this or that particular disease, there can be no doubt that such localities are unfavorable to the maintenance of robust health. Students of races, who have compared the dwellers upon the highlands and lowlands, are not in doubt as to the effect of climate, soil and surroundings upon heredity. Besides the large results in organic diseases, such as those of the lungs and the liver, there is little doubt as to a specific relation to some forms of fever. We, therefore, can assert, that it is the common consent of authorities, that stagnant water in rich soils is unfriendly to population. As such localities are often valuable for agricultural purposes because of their fertility, or suited by locality for cities, it is vastly important that the principles of thorough under drainage be fully applied. A high water level in the soil is one of the greatest disadvantages of any thickly settled locality. Many of our cities are to-day suffering as to the general health of the people far more from a water soaked soil than from any other cause. Thus the organic filth falling upon it is retained in a sodden, half decayed, or unnatural state until the summer suns dry away in part the water and sufficient heat and moisture combine to start the outspread compost heap into pernicious activity. Not sufficient vegetable growth being ready to appropriate the gases of decomposition and putrefaction, the human being must appropriate them, and thus many diseases arise and many deaths result.

It is in our power, both in city and country, to thwart this ill

arranged scheme of destruction by those simple methods which lower the water level and thus bring the air in constant contact with the material which it is thus fitted to utilize without injury to man. It is an axiom that stagnant water amid decayable vegetable matter is always hazardous. On the other hand circulating water always means circulating air, and the two remain the conservative elements by which life of all kinds is nurtured and sustained. In the various volumes of this Board and in its special circular on drainage facts and incidents have already been given to enforce these views. Although there are multitudes of localities needing this drainage, and although every house and every building site need to be studied in their drainage relations, it is gratifying to know progress is being made in this State. The large scheme for the drainage of the Pequest Valley has been so far and so long perfected as to leave no doubt as to its favorable influence upon the health of its inhabitants. This Board has for some time past devoted particular attention toward promoting drainage of the upper Passaic district, between Lower Chatham and Little Falls, which has been so long and so forcibly advocated by State Geologist Cook, by the State Water Commission and by various engineers. It so happened that three years since the co-operation of this Board was sought by several township committees of townships bordering on the Passaic river. By reason of many disasters to crops and to health, and especially of a recent summer freshet that had submerged and destroyed the growth upon thousands of acres of cultivated land, these committees met with the State Board of Health at Caldwell, and we were able to collect a large number of specific facts.

Although legal proceedings had long been pending to remove or lower the dam at Little Falls, which greatly contributed to the disasters, there seemed little hope of speedy relief in this way. After this conference the Secretary opened correspondence with the owner of the mills, who responded by sending his engineer and his legal advisor to have an interview with the Board. A plan of relief was proposed, as to which the Secretary requested a further conference with Prof. Cook, Engineer Howell and himself. The plan proposed was found open to serious objection, but it led to an agreement that Engineers Hilton and Howell should traverse the stream to settle certain disputed points, and that still further effort should be made to devise a plan for relief. To this Mr. Beattie, the owner

of the mills, responded with new effort and additional engineering aid. A large mass meeting of the people of the various townships held under the leadership of Hon. Augustus Cutler and others, was of much service as well as the continued action of the conference committee appointed at Caldwell. Without full detail, suffice it to say that the co-operating engineers finally agreed upon a plan which proved satisfactory to all parties. Under the direction of the legal advisors the scheme was perfected, the necessary money provided and the work begun at the close of the year 1888.

Messrs. Geo. W. Howell, C. E., C. M. Harrison and J. H. Blauvelt were appointed commissioners. We add a brief statement by Engineer Howell as to its progress thus far :

Commissioners to Drain Meadows on the Passaic River and its Tributaries.

GEO. W. HOWELL, Morristown, N. J.	} <i>Commissioners.</i>
C. M. HARRISON, Verona, N. J.	
J. H. BLAUVELT, Paterson, N. J.	

MORRISTOWN, N. J., Nov. 15, 1889.

Dr. E. M. Hunt, Secretary State Board of Health, Trenton, N. J.:

MY DEAR SIR—Yours of 13th is received. The work of the Passaic drainage is in progress. The modified plan proposed by the commissioners was adopted. Satisfactory arrangements have been made with the Beattie Manufacturing Company whereby no award for damages is to be paid to them, and they at their own expense make all changes in their dam which are contemplated by the plan, including erecting and forever operating gates in said dam of capacity sufficient to carry a volume of water in times of flood twenty-five feet wide and sixteen feet deep.

The contract for the entire work to be done by the commissioners has been let to Alfred B. Nelson, of New Brunswick, who has given bonds and has begun his work. He is now running three steam drills, working both day and night shifts on the lower reef lying just above the dam. He puts down and charges successively with dynamite from twenty to forty holes, the water being two to four feet above the rock, and the holes some eight feet deep and reaching below the specified grade. He then removes the float from which the drills work, and after covering the spot with a floating mattress to prevent flying stone from injuring the Beattie mills, only 150 to 200 feet away, the whole is set off by a battery. The results of the blasts are very satisfactory, the trap rock being thoroughly broken up into small pieces easy for removal by scows to

the shore. After a blast the loose stone lies piled up above the surface of the water.

The work has not progressed sufficiently to make any abatement of back water as yet. We expect to push on through the winter, and hope to show some practical results next season. The full benefit cannot be expected till the whole work is done, and after that it must be supplemented by ditches leading into the lowered river and the cleaning out of old water courses, which must be done by the landowners themselves in order to receive the full benefit. The contractor is expected to complete his work within a year and a half from the present time.

The commissioners have issued bonds, the proceeds of which will be applied to the work. After completion, assessments will be made on the lands benefitted and the bonds will be retired. We have issued \$130,000 of bonds, which we are allowed to sell down to ninety per cent. We shall put on the market only sufficient to do the work. Assuming the probable cost as \$100,000, a fair estimate, the contractor takes \$45,000 in bonds at par. We have sold for cash at par \$40,000, thus leaving only \$15,000 to sell. No bonds have been sold less than par.

Yours, very truly,

GEO. W. HOWELL.

The validity of the "Act to provide for the Drainage of Lands," March 6, 1871, and the supplements thereto has been approved in the Supreme Court of this State, in a decision reported in 6th Vroom's Reports, page 497, and in the Pequest case (a similar case under the same Act) in the Supreme Court, and in the Court of Errors and Appeals of this State, 10th Vroom, p. 433; 12th Vroom, page 175; 13th Vroom, page 553; 14th Vroom, page 456, and in the Supreme Court of the United States, 114 U. S. Reports, page 606.

These decisions are final and conclusive upon the validity of the Act.

There are other districts in the State which need similar relief.

But we especially desire to fix attention upon the needs of various homesteads and small villages in country localities, to the fearful neglects in cities, and especially in the extending of their area upon low and undrained lands, causing an amount of sickness or loss of vigor too apparent in pale countenances and shortened lives. It is a great mistake to provide sewers, to introduce water supplies without previous attention to the demands for drainage. A ground foundation capable of maintaining a water level not less than ten

feet below the surface is the first prerequisite to successful city life. Unfortunately our population as a State must be centred near tide water, and there are especial reasons for insisting upon artificial aids to natural drainage. It is to be remembered that every erection of houses and occupancy of streets interferes with natural drainage as aided by sunlight, evaporation, etc., and that we must by artificial methods compensate for this if we would preserve the salutary operation of natural laws.

We thus once more commend this subject to the attention of all sanitarians and all citizens.

HOUSE SEWAGE, OR HOW TO REMOVE IT.

No more important question addresses itself to all householders than that relating to the removal of all soiled liquids from dwellings or from near proximity thereto. Unfortunately at the beginning we are disturbed by the fact that in England and on the Continent this is known as house drainage, and so with us the term is sometimes confounded or not fully understood. Besides climate and other considerations make it not safe for us to follow all the rules laid down by foreign authors. But fortunately good use has been made of the studies and labors of foreign engineers and our own faithful practitioners of the engineering art have been able to add much that is valuable. Indeed, we are quite justified in speaking of American methods of removing and dealing with sewage. The first principle of all is that all of these fouled liquids must be gotten away from the building, and unless the grounds are of large extent, also away from the premises. This is easily done in the open country without any system of water carriage, but in city life and especially where a public water supply is freely introduced into houses, it seems almost indispensable to have these liquids conducted away by pipes.

The principles as to the kind and construction of these are plainly laid down.

The receiving pipes should be of cast iron and such as have been thoroughly tested under proper pressure. At one time tarred pipes were preferred, but it has been found that the coating was used to fill up minute holes or to conceal them after they had been filled up with soluble material. Confidence was also placed in the weight of the pipe until it was discovered not to be of equal thickness

throughout. So this test was not accurate. Fortunately the time has come when tested and warranted pipe can be had, although this is not generally put in by plumbers unless the contract specifies it. Improved methods are also in use for the complete joining of the pipes so that there is no risk of leakage at joints. It is now well understood that pipes should, as far as practicable, be visible, and especially that at the lower part or basement they should not be under the floors, but easily within reach. The Durhow system has carried the idea of separateness and exposure so far that it is constructed quite independent of any support from the house and would be left standing if the entire building were consumed.

It is now also agreed that wash basins or closets should not be in sleeping rooms, and that even in the bath rooms all fixtures should not too soon join in a common pipe. Not only must the traps be distinct, but so located that one will not affect the other.

It is a great fault that in the architects' specifications for buildings or alterations the pipe and fixture work is not shown in section or elevation like the rest, and so too much of detail is left to the plumber. The specifications and drawings should be in full and the drawings should be framed, so as to be preserved and thus be at hand whenever any repair work is to be done. There is such variety in basins, bath tubs, closets, etc., that every item needs to be specified so that the best modern appliances can be secured, and most of these have been furnished within the last ten or fifteen years. Next in importance is the securement of free circulation of air through the various pipes that convey the sewage. As to this there are two sets of opinions. Some claim that the only traps in the whole system should be those that are under fixtures and that there should be no trap between the house system and the sewer. In fact the introduction of an intermediate trap came from American custom. It has so commended itself that many English engineers now favor it. It is the more approved method with us. Those who oppose it contend that the street sewers or the outside cesspool, if there is connection with it, should be kept so well aired as that its air may circulate with impunity through the house pipes. But this security is very difficult of attainment. There is also much comfort in knowing that you are cut off from the foul air of other houses and from any that may be generated in an outside cesspool. It used to be asserted that the disconnecting trap will become a

place of deposit, but examination of traps through which there is a flowing stream shows that if there is proper fall and if the crown of the trap is five or six inches below the pipe this will not occur. We, therefore, favor a trap between the house system and the outside fall. But in all such cases not only should the system of house pipes be carried out above the roof, but from the lower main outlet pipe just inside of this intercepting trap, there should go up to the roof another pipe for ventilation. It is sometimes forgotten that in order to have circulation of air in pipes we need two openings. Else the opening made by carrying the main pipe to the roof is only a vent for pent up gases and not a ventilator in the sense of securing a current of air moving through the whole length of the pipes. We must give plenty of pure circulating air to the inside system. Then those low forms of vegetable life which are the chief agents in oxidation and matrifaction are kept at work amid the sewage and on the material that tends to collect on the inside of these pipes, and so prevent those other forms of life which flourish best without air and become hazardous to health by the abnormal decomposition which they occasion.

With the best of workmanship secured in construction, it is to be remembered, that like most sublunary things, fixtures and pipes will occasionally get out of order and that time and rust corrode. So from year to year there should be some examination, which is greatly facilitated if the working plans were complete and have been carefully framed and preserved. While good work if placed so as not to settle will last for a long time, too great care cannot be taken to remedy in time any defect that may have occurred. Often the sinks or other fixtures need to be taken apart and carefully cleansed, where the main pipes have kept in good order. As to the proper ventilation of fixtures we may have occasion to speak at another time.

SANITARY CONTROL OF HOUSE CONSTRUCTION.

The time has fully arrived when the necessity of some control over buildings in process of construction or of extensive alteration must be insisted upon in the interests of those who are to live in them and for the general welfare of the public. When a house falls down such is the indignation and such the verdict of law, that

the contractor, if found guilty of negligence, goes for years behind prison bars. But where one is killed by such an occurrence, hundreds pine away and die from concealed evils. Besides specifications as to the strength of buildings there must, at least in all tenement houses, be conditions as to ventilation, as to light, as to halls and stairways, and fire escapes, and in every house some way of assuring the proper introduction and security of all pipes, and especially of those connected with the house drainage or sewerage.

Strange to say, even where full working plans are furnished by architects, it has not been common to show the pipes and their fixtures in section or elevation. The entire plant should be as much shown in detail as any part of the building, with all the relations to frame, timbers, floor and to steam and all other pipes. It is best to have an accurate drawing which can be framed for the bath room and kept as a working basis for all future repairs.

It is not enough to have the usual four-inch cast iron pipe of at least twelve pounds weight per running foot, but care must be taken to know that it is of uniform thickness. This and all the fixtures must be tested before use.

The plumbing law of this State is such as to give to Health Boards the authority to secure the most thorough construction. We think it will not be invidious to claim that Asbury Park has furnished us the best early examples of thorough method and thorough work. Dr. Henry Mitchell had resigned as health officer but felt it his duty to respond to an appeal from the Board that he should aid it in the execution of the law.

After having investigated the best methods, and having fortified himself by the views of Mr. J. C. Collins, Chief Plumbing Inspector for the New York Board of Health, and such plumbers as Mr. Edward Murphy and James Muir, of New York City, he secured efficient oversight of the work. At first every job was found defective, and it was claimed that he asked an impossibility. But to the credit of those concerned, be it said, that trial after trial showed the possibility and reasonableness of the demand. We have before us the account given by the local paper of the first success, when by means of an air pump the pressure of ten pounds per square inch as applied to all parts of the system inside of the house showed no leakage. The trial not only revealed the propriety of the conditions, but also showed that no pipe tarred or painted before test

could be trusted, and that apparently soil pipe condemned in New York got an extra coat and was sent to New Jersey. "I was convinced," says Dr. Mitchell, "that no house system of drainage is safe where no test for leakage has been applied during construction." An architect who had recently built a house of his own without this precaution has already been troubled by minute pipe leakage, and expresses his regret that the law was not sooner enacted.

Similar attention was given to the ventilation of the sewer system and even one put in by the Durham Company was found defective and remedied.

The following letter of Dr. Mitchell to the Board of Health of Asbury Park well presents the subject :

To the Board of Health :

GENTLEMEN :—By an act approved Feb. 24th, 1888, the Legislature extended to the citizens of New Jersey an opportunity to protect themselves against the dangers attending unsanitary houses. An ordinance was adopted July 20th, 1888, making some of the provisions of this act apply to Asbury Park.

The preparation of blank forms necessary for the convenient execution of the ordinance, delayed operations until Oct. 13th, 1888.

Since the latter date thirty-three plans and descriptions of house drainage have been filed in the office of the Board.

The difficulties to be encountered in executing the drainage and plumbing ordinance were comprehended and anticipated, and no satisfactory solution for the perplexity was found, but the advantages to this community to be derived from carrying into effect the salutary provisions of this ordinance, led this Board to make an effort to bestow its benefits. The task seemed quite beyond the resources of the Board. With no officer who had had any experience in the construction of drainage works, and without funds to employ a suitable person, the outlook was not encouraging, for a responsibility rests upon the Board to give to house owners the best of advice or none. Securing all available aid, the Board has cautiously proceeded, and no serious mistakes in administration have thus far been discovered.

The value to Asbury Park of the protection against unhealthful houses, which will be afforded by the intelligent execution of the ordinance referred to, may be illustrated by the following incident : Mr. X. finished up a handsome residence last fall, just previous to the exercise of the Board's supervision over drainage construction. A few months after the house was occupied, offensive odors were

observed in the building, and investigation showed that the soil pipe joints were so imperfectly made that through one of the openings a finger could be thrust.

Not one job which has been performed under supervisors has been found to be gas tight upon the first trial of the air pump, and one of our most skillful and experienced plumbers has said that no such thing as a tight soil pipe is in existence, except where the defects have been detected by the pressure test. The time has passed when we should stop to consider the relations born by pervious house drains to health; nor should we assume that pervious pipes are harmless when the drain is disconnected from the sewer, and good ventilation of all portions of the drainage system is secured, for we know not all of the methods of diffusion through the atmosphere of which disease causes are capable, and nothing short of air-tight barriers will afford certain defense against the entrance of these subtle influences.

Experience elsewhere has shown that tar applied to cast iron drain pipes may cover a multitude of defects in the metal, and the effectiveness of tar as a plugging for cracks, crevices and sand holes has been found to be of short duration. Thereupon this Board has required that no such flimsy veil shall be depended upon to fortify poor pipes. Our effort is to promote health and save lives, and the additional cost to house owners involved in the use of substantial pipe which will stand calking, and which is gas tight, and which requires no support from a flim of coal tar, should not deter us from insisting upon this essential requirement. The claim recently made by several of our plumbers, that it was impossible to comply with this requirement because the market will not supply the desired quality of pipe has been set at rest by the procurement of pipe which is in every way up to the standard we have fixed.

The air test of ten pounds pressure has also been objected to, but it has been found very effectual in disclosing defective pipes and poorly constructed joints, and it is applied with less delay and annoyance than attends the use of water. No other means of testing new work need be referred to here, for there is none in use which compares in efficiency with those already referred to.

The experience of the past few months indicates that house drainage construction has been heretofore performed in a careless and dangerous manner. The principles involved in the work have usually been correct, but the material and labor have been poor. Under the present regulations if they are well executed there is little opportunity for deviation from established principles, or for the use of poor material, and the scrimping of the work.

Newark and Camden have made some progress in carrying out the law.

CITIES--THEIR NEEDS AND THEIR REGULATIONS FOR PROMOTING THE HEALTH OF THEIR INHABITANTS.

The advances made in recent years as to a knowledge of the conditions favorable to health are such as to enable us with considerable precision to outline the sanitary requisites for a healthy locality, as well as the administrative methods to be pursued. Actual knowledge is far ahead of actual practice. Hence there is occasion for presenting this knowledge and for specifying how its more perfect application can be secured.

Since the evils to be prevented or overcome are more serious in cities, we shall speak especially of these. The same principles apply more or less to the country according to locality and density of population.

DRAINAGE.

The first consideration is that of drainage, and yet it is the one most frequently overlooked. If a capitalist, intelligent as to sanitation, had to choose a site for a city he would very early turn his attention to the character of the geological structure; the soil, the height of the water level in the soil and the artificial means to be used to secure its dryness, which means its porousness. Upon the porosity of the ground depends its power to receive air and so to properly conduct those changes of decomposable organic matter which are essential to good health. If these changes are so interrupted as to suspend at one time and to take place in excess at another, or if made unnatural by forced conditions instead of the orderly decomposition of nature, we have putrefaction or other unnatural changes of organic matter. The power to receive air depends upon the power of the upper ground to circulate the water which falls upon it and not to retain it in a stagnant state. This means that the water level in the ground must not be near the sur-

face. Most cities, or parts of most cities, stand in need of deep drainage. By deep drainage we mean land tile or other material for drainage, placed from eight to fifteen feet beneath the surface, sufficiently near to secure this circulation and having such grade or descent as will secure flow. Even if the ground of a city is well located and with usual tillage and croppage would keep itself as a circulating medium, it is to be remembered that excavations in it, buildings upon and streets shutting out much of sunlight and wind and interfering with evaporation complicate the original conditions. Drainage is rendered necessary in order to compensate for these artificial disturbances. It is all the more important because in addition to its indispensable aid in disposing of the organic or decayable matter and the rains which will fall on the ground, there is no other way of securing such dryness of streets as is necessary to prepare them for pavement. If in the laying out of a city this has been neglected, it is all the more to be attended to before the city reaches out to the suburbs. Very much also can be done in the built up portion by thorough deep drainage up every street and alley, and often of the parts of yards adjacent to the cellars.

Many a city would practice a great economy, if, before turning its chief attention to water supply and sewerage, it would thus do this cheaper and valuable preparatory work of securing healthy foundation for all other salutary and health promoting efforts. Where there are canals or feeders running through a city these need special care, and generally deep drains should interpose between these and the built up portion.

Especial care must be taken as to natural or artificial ponds within the city limits. Many a natural pond becomes artificial when a city is built about it, since some of its usual springs are dried up, and besides receiving much decayable material which is thrown on or falls into it, it receives more or less of wash and of the fouled water of the upper soil. Equally bad are those artificial ponds or pools of water which are made by the piling or removal of earth. Some cellars built under houses are an evil, and the houses would be better if erected on pillars with double flooring with even ground beneath. Stagnant water here and there in the country may be compensated for by luxuriant foliage and by occasional ebb and flow, but in the city the stagnant pond or water stagnant in the upper ground or cellar, is the enemy of health. No moneys from the

city finances is better expended than that which provides efficient drainage.

WATER SUPPLIES.

A pure water supply is indispensable to city life. Impure water is a special conveyance of disease, since water is so readily absorbed in the system and as the great purveyor of the body distributes its contents to every part. This does not mean that all water containing foreign matter will cause apparent sickness, since it is only when conveying the particles of specific disease that it especially declares its evil results. Oftener it causes diarrhœa, dysentery, dyspepsia or general malaise. It is a tax upon natural vigor, and to neutralize its effects appropriates vital force, for which there is plenty of demand in other and more useful directions. True sanitary care not only seeks to keep us in life, but to keep and render available all of our resources for vigorous health and service as well as for life.

A water supply should always be selected by those who know the quality and quantity of its source and are able to reckon upon its continuance and its sufficiency and purity for the growing wants of the city. Then however wise may have been the selection and plant, there is need of constant skilled oversight if its reservoirs, its pipes, its house connections and all that relates to the preservation of the water and its modes of conveyance from contamination. This means far more of technical and frequent examination than is generally secured.

It also needs to be known just how many houses do not take it but depend upon city wells, which as a rule are always hazardous. We are constantly surprised to find from fifty to one hundred wells in cities where the general water supply is of unquestioned quality. In some cases not over one-fifth of the people use the public supply and yet the city is quoted as if all used the city water. The closing of city wells often becomes the imperative duty of city health boards.

SEWERAGE SYSTEMS.

It is now conceded that every city having a public water supply also needs a general sewer system. Fortunately we have come to a period when the ordinary bricklayer on the committee of council

no longer regard themselves as competent to devise a system for sewerage disposal. So radical and important is the whole scheme that the very best plans and the very best workmanship must be secured, which always means the plan and oversight of a competent engineer. Sewers are now constructed so much more cheaply and thoroughly than formerly, that there is great encouragement to cities to be provided with them. Many cities that have old systems and cannot yet afford entirely to supercede them, need to have a full examination made and man-holes and other modern improvements furnished. The old unventilated, sewage-retaining sewers are to many of our older cities a very great nuisance, and should be thoroughly improved or replaced. A filthy sewer retaining much material on its sides is but an elongated cesspool, and as such a long drain and persistent menace to the public health.

The matter of house connection with sewers is always one of the greatest importance, and should not be trusted to the general workman alone. Every connection should have inspection before it is covered up.

Every city should have its complete sanitary map showing all underground pipes of every kind, so that in any change to be made all the relations are kept in view and so that points for joining or repair can be reached without any guess-work excavation. Even where this has not been done at the start, all new work should be thus mapped.

The facilities for cleansing sewers without frequent openings are now numerous.

There should be such inspection as will secure them proper condition. It would be far better for most cities if the chief streets were tunneled so as to give ready access to all pipes and to afford a mode of disposal for water, sewage and debris of various kinds. With the electric light and proper arrangement of all pipes in the underground passage, such a system would be found economical in the end. (See article by Secretary on this subject).

REPORT OF A. P. H. ASSOCIATION.

It is always very important to secure such thorough *outfall* for sewers as that the mouth is never water sealed or clogged in any way. This means frequent inspection. We shall not discuss the

various means of disposal of sewage, which have so greatly multiplied, and often are so combined as to be very satisfactory. The mode of disposal is greatly modified by locality.

Where cesspools are still in use in several cities they should be thoroughly cleansed and then filled up. There may be rare exceptions in very porous soils where there is a public water supply. Experience, however, shows them to be hazardous, and especially since heating apparatus is generally put in basement and cellars, which tend, especially in winter, to draw the surrounding ground air into the heated cellar.

WATER, GAS AND OTHER PIPES.

The underground of our cities has become such a thoroughfare for various forms of pipes that we are to remember that all these need care. If the water pipes leak the ground is made too damp. If the sewer pipes leak, as they too often do, decomposing matter is deposited in the soil. If the gas pipes leak the soil is filled with gases which mingle with others and find their way to the air so as to contaminate it. We recently saw an examination of gas pipes in which nearly every joint uncovered would take fire on the application of a match. Water gas is so cheap that it is cheaper to lose much than to dig for leaks. The localities of all pipes should be mapped, and the city authorities, as well as the companies, should have these regulations.

CARE OF STREETS.

The thorough care of streets is not only a comfort but much more concerns the health of cities than is generally supposed. First of all there is the matter of proper pavement. There are now to be had most excellent forms of impermeable pavement, easily cleansed and sufficiently smooth without being slippery. But it is in vain to put down good material for pavement unless there is deep street drainage, thorough preparation of the ground on which the pavement is to be laid, so as to reach below frost, and skilled workmanship in its adjustment. We have from personal view had opportunity to contest the method of paving the streets in London, and a part of the chief streets of our capitol city. The one will last with but little repair for half a century, the other is always out of repair.

Much of the surface cleansing of streets should be done at night, and even the sidewalks should not be swept in the faces of those

passing. Besides the discomfort, it is not appreciated what damage to health occurs from city dust. It is made up of dirty mud, of droppings of various kinds and of various forms of decayable matter. This in a finely triturated state mingles with the air and has to go into the lungs and stomachs of the people. A very dusty city is always more unhealthy.

Water sprinkling in hot days or when there is much dust, is much the choice of two evils, but if this has to be carried to the excess of causing undue moisture, it too, becomes an evil. We desire to emphasize the injuriousness of city dust and to claim its abatement as a nuisance which interferes with the health not less than the comfort of the people.

BUILDING INSPECTION.

Experience has proven that in all of our cities there should be authorized oversight of the construction of buildings. So common has become the use of improper material or slighting of the work of construction that the terms "jerry building" and "scamping" have come into common usage. But it is not only imperfect material and workmanship. Ventilation, especidly in tenement houses, must be provided for ; hence the laws of many cities now designate the area of windows or light space in proportion to size of rooms, the proper construction of entries for light and for fire escape and prohibit the erection of rear houses. Parts of our cities are already showing the overcrowding which is so common in New York City, and precautions must be exercised in time. In our State especial provision has been made as to the plumbing of buildings. The house is the sanitary unit. No city can have sanitary safety unless the house is made to accord with the conditions for health. Our present Plumbing Law instead of being applied in three or four of our cities, should be enforced in all of them.

HOUSE INSPECTION.

This refers to such examination of houses after they are constructed as will inform the health authorities as to any defects and as to the way in which they are occupied. Thus only can it be known whether they are kept in accord with the necessities of health. House to house inspection by a competent inspector is

indispensable in every city. While in many cases there may need to be brought in operation the requirements of law in more cases, great changes are secured by pointing out the evils and indicating or aiding in the modes of relief. While the more active administrative result as the removal of nuisances found, almost as much is done by preventing others or by stopping them in the very start.

An error of most Health Boards is that inspectors are allowed to make verbal reports. A schedule of each house visited and particulars as to it should be kept on hand, in books similar to those issued by this Board. This re-inspection when required is simplified and the work of the inspector and his recommendation are open for the Inspector of the Board. Only thus can the results of inspection be secured. At the same time the inspector is more thoroughly educated to his work. We are aware that the pay of inspectors is meagre, but the best way of increasing it is by the excellent quality of the work done.

COLLECTION AND DISPOSAL OF GARBAGE, ASHES, ETC.

No city can dispense with ordinances fully regulating the collection and disposal of garbage. Under this head we include all the refuse of the household, independent of that which naturally goes through the sewer connection or into the outside privy. While we have before urged the importance of burning and so using up much of the material generally classed as garbage and the keeping separate of ashes, there will still remain much material that is disposed of with difficulty, not only in tenement houses but by the ordinary householder. However unsightly it may appear, health requires that houses and lots should be kept clean of all such refuse. Once when remarking to the Medical Officer of Health the amount of garbage thrown into the streets in certain portions of Edinburgh, his reply was: "We encourage all householders to bring refuse of all kinds to the street, for it is not then a hidden menace to health but is sure to be gathered up." Of course it is not meant that the throwing of garbage in the street is a desirable thing, although this is far better than careless concealment.

The only proper method is to put it in receptacles along the

street, from which it shall be taken at regular and well known intervals. The collectors should be fined if not punctual to the day or nearly to the hour. Boston and other cities have shown how possible is such a demonstration if only it is organized and enforced. Neither rain nor snow should interfere with its regularity. If garbage is found concealed on premises it should be a punishable offence.

If the health interests of the city are greatly concerned in the disposition to be made of the garbage, the ashes under regulation can be used for filling in. Parker & Sanderson showed that in the case of Liverpool ordinary ashes even mingled with some garbage, if all animal matter was excluded, would refresh or purify itself in two years without evil effect if evenly spread over a surface and not put over two feet in depth. For garbage in general, undoubtedly for cities, the best mode of disposal is by cremation in what are known as incinerating furnaces. The feasibility of their use has been demonstrated in many of our cities as well as abroad. For an outline of these see article on Disposal of Town Refuse.

Where one of these is not yet in use, the garbage grounds should be carefully chosen and should be watched by an inspector. We have known a wet dumping ground within city limits well adapted for the disposal of ashes and some garbage to become the promiscuous receptacle for the spoiled offal of the butcher, the decayed vegetables of the groceryman and the carcasses of various small animals. This not only means discomfort for all passers by, but a pollution of city air.

NUISANCES.

So as to the removal of most nuisances. It is not enough that they be found out and prompt action ordered. There must be strict direction and oversight as to the mode of removal and the disposition to be made thereof. The mode and time of removal may even become a more exciting cause of disease than the temporary retention under the free use of disinfectants.

KEEPING OF ANIMALS IN CITIES.

In our cities we cannot, as does Venice, do without horses, and to this class of domestic animals must be largely provided for. It

is not a very simple problem. In the interests of owners, as well as of the animals themselves, they need in their stables to have air and cleanliness. Heaps of bedding, partly impregnated with secretions, are the source of much disease to horses and bad for those attending them. All stables need to come under the eye of the Sanitary Inspector. In the attempt to avoid heaps of manure we have seen the pits for its storage become very foul, and while fermentation is going on give rise to bad odors. It is a good provision when the used-up litter and the material mixed with it can be frequently removed to the country. Where its importance is urged this can generally be arranged.

It is right to insist that in cities stables should be kept in accord with the demands both of comfort and health. Car stables need especial care because of their size and of the frequency of diseases among the horses. There, too, is generally stored the salt hay or straw, still used in too many street cars as the wretched receptacle of dust, moisture and filth.

As to other animals, swine have no claims upon city privileges. Except in the most scattered localities they are always a nuisance. We have frequently known the owner to contend for the right to keep them, but never the next-door neighbor, unless he too had a similar investment. If allowed at all pens should be registered and frequent inspection had. Most cities should have an ordinance prohibiting their keeping, and if not whenever a pen is offensive it should be dealt with under the general ordinances as to nuisances.

The keeping of cows in cities must always be a matter of Health Board register and regulation. It is rarely that a cow yard is not a nuisance to neighbors. It could only be prevented by inspection for which the owner should pay a moderate sum. When the yard is found a nuisance that cannot be regulated by reason of locality or for other cause, it should be dealt with as a nuisance. As experience proves that most of the disease of cattle begin in cities or are fostered thereby, the farming as well as local interests requires skilled inspection.

As to goats, winged fowl, etc., it is proper that there should be regulative ordinances, or that they should be dealt with when causing nuisance.

SLAUGHTER HOUSES.

These are so difficult to keep in proper order in cities that they

are generally consigned to the adjoining country. There an abattoir can be established and be under thorough supervision, many of the evils are prevented and the establishment can be tolerated. Even then the cattle should not need to be driven to it through the streets.

INSPECTION OF MARKETS.

This is becoming more and more important in our larger cities not only as to the sanitary keeping of the market itself but as to the inspection of meat, vegetables, fruits, etc. Many diseases arise from food which was not in a fit state for selling. The chief remedy is to have a skilled inspector under the direction of the Health Board. Some of our cities already have this plan and find it a valuable check upon the sale of unfit goods.

DUTIES OF HEALTH INSPECTORS.

We have already spoken of the duties of Health Inspectors as to the single item of house to house inspection.

Their first duty is to educate themselves in their work. Experience is one of our teachers but one's own personal experience is not enough. The reports of the Board and a few hand books give information as to the duties of inspectors, and impart such knowledge as will much aid them to inspect with skill. The inspector must have a thorough knowledge of his district. The need to have some one else inform him of nuisances will be the exception to the rule. He will either discover them when beginning to be as well as to be on the alert to prevent their occurrence.

He must keep himself well informed as to all methods of dealing with contagious diseases and secure isolation and such disinfection as is in accord with the best approved methods. While at the command of the Health Board he is still more their agent to apprise them of needed action. His reports should always be in writing and placed on file, although in many cases the written portion may be brief and comments and explanations be given verbally. No officer more needs to conform to strict executive and administrative methods. His salary should be in proportion to his knowledge, his skill and his diligence in his work. Let the ser-

vice be well paid for but never let the position be a sinecure or based upon that he has done or can be done for a party.

REPORT OF CONTAGIOUS DISEASES.

There has been a growing sentiment that prompt reports of certain special contagious diseases are essential to the proper sanitary government of a city. If any physician has been inclined to regard his relation to his patient a private matter, in no case involving a special duty to society, he is simply behind the ethics of his profession and thoughtless as to his personal relations to community. Our law carefully guards his report as not a public one and provides proper compensation for the service. The article of President Boyles, of the New York City Board of Health, as given in our twelfth report, so well outlines the duty, the mode and the action of a Board or an Inspector as to it as to leave little to be said. A prudent Inspector comes to be in such cases a great aid to the physician in attending to the sanitary condition. Where the physician is sure that nothing is needed from the Inspector it is proper so to state. Some of our cities are succeeding well in this oversight of disease and physicians are recognizing the necessity of this co-operation.

HOSPITALS AND ISOLATION OF CONTAGIOUS DISEASES.

While there are many cases not needing removal to a hospital there are others in which such separation or isolation is imperative. Frequently in tenement houses there is not only unavoidable exposure for others but the means of care and nursing can not be secured. It is also often the case in an epidemic that the locality seems to have become impregnated with the materials for the disease and so removal gives opportunity for the more thorough access of sunlight, wind and air, and for the use of artificial disinfectants and the needed washing and scrubbing.

The determination as to removal must always be left to the health authorities.

Every large city should not only have its outside hospital for contagious diseases but should have before hand its well devised plans for contending with an epidemic, both in its inception and in its possible extension. It is as foolish to postpone preparation

until the disease is upon us as it would be to delay procuring fire apparatus until the smoke or the flame declared the need of prompt action.

As to preparation we can learn much from military methods. Even our smaller cities should have small houses already constructed which can be put together at very short notice. All the contents for a small hospital should be equally ready. Tents are very available, and if only constructed as hospital tents and put over a flooring they can even in this climate be made much more comfortable than is generally supposed. We give here a model of a hospital tent and which can be quickly and economically prepared. (See Ontario report). If vaccination is properly enforced and proper care taken as to separation and compartments the same grounds may be used for a hospital for various contagious diseases and cities should own some well chosen spot and not be left to secure one amid the objections and excitement which the sudden fear of a contagious disease causes.

DISINFECTION AND DISINFECTING APPARATUS.

So much information has been issued by the Board as to modes of disinfection and as to the materials to be used that it seems almost unnecessary to do more than call attention thereto. Yet a complete carrying out of the details of disinfection is among the rarest of sanitary arts. The sprinkling of some patented compound with little disinfecting power but much odor, the placing of a little saucer of chloride of lime under a bed and such like "dabs of sanitation" are too common. Airing, washing and the use of a right quality and quantity of disinfectants are of the greatest importance. In many diseases, the locality and the clothing do far more to spread the disease or to continue its transmissibility than the person. Disinfectants act only in proportion to the amount of material they give up to the water, etc. Thus the value of chloride of lime depends on the amount of chlorine it contains and liberates. Sulphurous acid and chlorine gas act very feebly in the absence of moisture. Let it be understood that thorough disinfection has very great value in checking and preventing disease, but as usually performed it is a delusion and a snare. The directions given in our circulars must be carefully followed, and it is better still if done by

an expert or by some one who has followed for a day the disinfecting corps of such a city as New York and seen the actual process when thoroughly carried out. There needs to be the same exactness when dealing with persons, with single rooms, as with clothing. As it is often desirable not to destroy all clothing some form of disinfecting apparatus should be in use in our cities. The Ransom stove has been most used, but now there are a great variety of furnaces. See for full description, Transactions of A. P. H. Association.

The clothing should be carried to them in an air-tight metallic van, which itself is also disinfected from time to time.

PUBLIC BATHS, PARKS, ETC.

Besides the items named there are various other sanitary provisions which either come under the care of local health authorities or should receive from them advocacy and encouragement.

Public baths are found greatly promotive of cleanliness and health, and are largely patronized. Parks and open spaces are of the greatest importance to the health of cities. Trees are often too frequent in cities which are too often more than enough shaded by narrow streets and tall buildings. The various laws as to adulteration of foods, sale of kerosene, etc., should receive attention where any special occasion seems to call for inquiry. Every case of alleged poisoning by food or of explosion of lamps should be inquired into and reported if need be for fuller investigation. Accidents that may have arisen from carelessness or imperfect construction, should often fall under the notice of those looking after the great interests of health and life.

VITAL STATISTICS.

These constitute the record of increase and loss which the State keeps as to its greatest material resource—its population. Authorities are agreed that these records are indispensable in the study of those momentous questions which have to do with the health, the productive power and the lives of the people. The collection of these items must necessarily be committed to local authorities, and should in some way be under the direct or collateral administration of the Local Boards of Health. Most of our cities make very

imperfect use of these statistics. While the State Board aggregates the figures and studies them in their broad relationships, the city must study them in their relation to seasons, and to their own localities." The Health Officers should know each day what deaths have occurred; in what ward, street and house, and if the disease is a contagious one, the locality should promptly be inquired into. If not a contagious disease, there is no such haste, but as the figures accumulate, these too, are to be studied, as to locality, etc., and different parts of the city compared. At the close of every year the city record should show in what house each death has occurred, and that record should be studied as an index of the causes and courses of disease. Still more valuable are the summaries as they give year after year—when a quinquennial or decennial summary is reached—the information imparted is still more valuable. Marks of cases on maps, and graphic lines or colors aid to impress the facts. In some of our cities the compensation received by the Register is at present enough to pay for all this, and where it is not it should be secured. The Medical Health Officer cannot administer to his satisfaction or for the best welfare of the city without these data. The law is now sufficient, and cases before the courts have so sustained it that if these vital returns are not nearly complete not only Ministers and Physicians and Undertakers are to blame, but the Health authorities.

BOARDS OF HEALTH.

We have left the consideration of these to the last because the law itself and circulars already in circulation and various ordinances passed so clearly indicate their sphere, their duties and the modes of administration. Notwithstanding the law is so framed as to limit partisan consideration, we are aware that those Boards are sometimes embarrassed by political complications. The most partisan official politician with whom I ever had to deal, once said to me: "I know enough not to push politics into health administration." Would that all had knowledge and conscience enough to say that. But at any rate Boards of Health must also know how to do the very best they can amid all embarrassments. No service needs more expert knowledge, more patience, more zeal, more faithfulness. It must avail itself of all the conditions and appliances for the most exact and business-like administration. It must know

the scope of its work, be both persuasive and bold, understand the doctrine of justifiable expediency, as well as that of prompt enforcement of law. Its details of service need not here be again reiterated. But in it the faithful Health Officer and his aids are doing noble work for the city, the State, the people, and faithfulness and ability obtain recognition if not always adequate pecuniary reward.

Let this outline of health administration be suggestive of the great scope, duty and necessity of the work, and prompt all to new devotion in its oversight and accomplishment. It means nothing less than being a public benefactor in all that relates to health and life and to the best physical, intellectual and moral welfare of the whole population.

DISINFECTION.

The sanitary and disease experience of each emphasizes the importance of the most thorough methods for preventing the spread of disease, that these methods are in some regards very fully settled. We will continue to have theories as to the origin and cause of disease, but no one has yet been found to advocate foul air, impure water, bad food, filth and general absence of cleanliness as favorable to the prevention or limitation of disease. On the other hand every new discovery as to the specific character of some diseases and as to the necessity of the presence of a special microtype or germ has left undisputed the need of purity in all things, as promotive of health. While it is not contended that filth will originate certain of the specific diseases, yet it is admitted that they are all rendered more malignant and are more likely to extend amid filthy surroundings. There are also many also who believe that under laws of combination or evolution, many common diseases take on a specific as well as an aggravated character.

It is well understood that in our combat with disease, as well as for its prevention, the great law is to secure pure air, water and food and to remove all such organic matter as is likely to pass into decomposition, and especially that of the putrifaction type. There are natural decompositions which may go on in the presence of life, and for which nature has at hand competent or compensating provisions. There are others so special in locality and circumstances, or so excessive in abundance that there is always hazard to

health in their presence. There are also forced, anomalous and artificial decompositions. Just as by certain methods of smothering we get charcoal, instead of the usual mode of consuming of wood and may stored up gases capable of destroying life, so we sometimes wholly change the natural order of decomposition and beget products full of special risk. The knowledge or theories of the past dozen years as to the omnipresence of low forms of vegetable life related to specific diseases, has not increased the probability that we shall be able to remove from human dwelling places all the germs or particles of communicable or other diseases. But it has put us on the alert to dilute or dissipate these by fresh air, by washing, and by the addition of certain articles known as disinfectants and by isolation to protect persons from those known to be actually suffering from contagious disease.

We have from time to time noticed the secondary but yet important place which disinfectants occupy, and in our reports and by circulars have set forth the facts as to the preferences to be given to various articles and the modes of their use.

While the last year has furnished no special discovery in this line, it has emphasized the value of corrosive sublimate, and has shown how important it was to rid sick rooms of useless furniture and after the disease has abated to cleanse the walls and all free surfaces. The rubbing for instance of walls with dry bread has shown that in this way more of the minute particles of specific diseases are removed than in any other way. We have even heard of men offering their services in such as bread rubbers as a part of service for hospital and sick room cleansing. It has also been shown, especially by Dr. Squibb, of Brooklyn, and Dr. Prudden, of New York City, that sulphur fumes are not as effective as they have been claimed to be, especially unless given off in the presence of moisture. Dr. E. R. Squibb speaks of it thus :

It seems to be absolutely proven that the one element necessary to the activity of all virus is moisture. Desiccated virus is inactive and impassive ; and when desiccation is complete or perfect, as by a sufficient degree of heating for a sufficient length of time, the change is such that the re-supplying of moisture does not reproduce the contagion.

But moisture is an element of varying degree. Too much by dilution may weaken active virus to absolute inactivity, as too little may weaken it to practical destruction.

Contagious matter or virus which is only sufficiently dry to be thus rendered inactive and impassive, becomes active by contact with moist surfaces, and thus moisture becomes the essential element in its contagiousness by supplying the conditions under which its molecules can resume the function of propagation or generation. This same element moisture, which is necessary to enable them to propagate contagion, is equally necessary for any reaction with agents which have the power to so change their molecular structure as to destroy their capacity for contagion.

Hence all disinfectants require the presence of moisture, and require it in a degree sufficient to enable all the molecules of contagious matter to commingle and react with the molecules of the disinfectant. If the moisture be sufficient in amount it matters little whether it be held by the virus or by the disinfectant, but the reaction will be much more sure and more prompt if each of the reacting substances be fully saturated with moisture. If either agent be dry or nearly dry, the reaction will be proportionately slow and imperfect.

The condition of the contagious material of an infected apartment, although not absolutely dry, has only the moisture of the common atmosphere, and if there was any such thing in the living animal as a dry surface there could be no infection from such air-dry contagious material.

An air dry disinfectant or antiseptic is equally inactive and impassive, and for the same reasons; namely, the absence of the physical and chemical conditions for reaction.

When sulphur is burned in air a dioxide of sulphur is formed. One atom unites with two atoms of the oxygen of the air to form an anhydrous, or perfectly dry gas which occupies practically the same space as did the oxygen combined. This sulphur dioxide is therefore a heavy gas, and as it cools after being formed by the combustion, it falls, so that any inclosure in which it is formed will fill up from the bottom as it would with water, and but for the laws of diffusion of gases, an enclosure might have the pure gas at the bottom and none at the top. The laws of diffusion, and the currents of air and gas caused by the heat of combustion, do, however, carry the gas to all parts of an enclosure and yet the gas is in greatest proportion near the floor, and any leakage there, as under the doors for example, will waste much more gas than the same openings higher up. * * * * *

Sulphur dioxide, resulting from burning sulphur in the air, is not a disinfectant, but requires the presence of moisture either with the sulphur dioxide, or with the infected matter, or with both. And, farther, that in proportion to the amount of moisture up to what would be a very large dilution, the more there is present the more perfect are the conditions for thorough disinfection; and the less

moisture there is present the more imperfect the disinfection.

Now, if the practice of Boards of Health and other authorities be examined, it seems to be very defective indeed, unless they use an abundance of watery vapor without thinking it worth while to mention it in their directions and practice.

The common usage seems to be to close up the infected apartments as thoroughly as practicable and to burn sulphur in them in the proportion of four pounds of sulphur to each 1,000 cubic feet of space. * * * * *

The conditions for a much better application of this agent are very easily supplied. To fumigate with the active sulphurous acid, instead of the inactive dioxide of sulphur, it is only necessary to evaporate water to the extent of three or four times the weight of the sulphur burned, or to wet the surfaces to be disinfected, or both, so that plenty of moisture may be present during the burning of the sulphur. A shallow pan of water upon a kerosene stove well started in advance of lighting the sulphur, and the floor, ceiling and walls well sprinkled with water by means of an ordinary dust-brush, is perhaps as good a practice as any.

There is abundant evidence on record that sulphurous acid in small amount is destructive to all the lower orders of animal and vegetable life, to all fermentations both vital and chemical; and, all that the more recent elaborate investigations seem to have shown, is, that the spores or germs of certain microscopic organisms were not destroyed by it as applied to them, even in the presence of abundant moisture in some of the trials. Many of the late investigations have been made with very great care and labor and by modern accurate methods. Some of the best results are, however, confusing, if not contradictory, and, therefore, are inconclusive, even in regard to the resistance of spores.

Chiefly from the above-mentioned considerations the writer reaches the conclusion that burning sulphur for disinfection should by no means be abandoned, but should be more thoroughly and more carefully applied.

Not only in diphtheria, but in all infectious diseases some such disinfectant is greatly needed in preventing the spread of disease, and diminishing the risks of susceptible persons, and no other method has yet been proposed that is more effective, more simple or of easier application.

In the less convenient and more costly method of disinfecting by gaseous chlorine the same principles apply, and the same conditions are necessary. Dry chlorine gas is as inactive as sulphur dioxide, and from deficient supply of moisture the one will fail as often as the other.

When chlorine is generated from common salt by means of dioxide of manganese and sulphuric acid, the salt and manganese are commonly mixed into a thin paste with water before the acid is

added. Then on adding the acid much heat is developed, and a proportionate amount of water is evaporated and disengaged with the chlorine. But this amount of water is far too small for the full effect of all the chlorine, and unless all the surfaces be well wetted, and steam be supplied, the disinfection will be defective.

If the walls and ceilings of apartments be kalsomined, or be covered with any other preparation of glue or paste, these should be scrubbed off clean with hot water before the disinfection, because disinfection does not destroy the tendency to putrescence in gelatine, glue, paste, etc.

Recently the value of lime and of whitewash has been more fully reasserted. We quote from a recent article as follows:

Lime, simple unslaked lime or freshly slaked, has long been used in various empirical ways as a disinfectant, and some recent exact studies in regard to its value, show, that for certain purposes, it is one of the most trustworthy of disinfectants.

In the early part of the year 1887, Dr. Liborius, of Kronstadt, Russia, communicated to the *Zeitschrift für Hygiene*, a paper on "Investigations into the Disinfecting Power of Lime." In summing up the results of his experiments he says: "An aqueous solution of caustic lime, of the strength of 0.0074 per cent. of the lime, suffices, in a few hours to permanently destroy the typhoid bacillus, and 0.0246 per cent. suffices for the destruction of the cholera bacillus.

Cholera bouillon cultures containing an abundance of fragments of coagulated albumen, which offer as unfavorable conditions for the action of the lime as natural cholera dejections would, were likewise completely disinfected by the action of 0.4 per cent. of pure caustic lime in fragments.

Under these unfavorable conditions, the most effective form of the lime was pulverized pure caustic lime, or as a 20 per cent solution (Kalkmilch).

In the latter part of last year, in the same journal, Dr. Kitasato, of Tokio, Japan, gave the results of rather a wide range of experimental work to determine the action of acids and other alkalis upon typhoid and cholera bacilli. As regards the action of lime upon the typhoid bacillus, he found that the addition of 0.18 per cent. sufficed to destroy typhoid bacilli in neutral bouillon culture, and he concludes that "caustic lime, is a very suitable disinfectant for typhoid and cholera bacilli, for the reasons that it is very effective and very cheap, and is to be found everywhere.

In the early part of the present year in the same journal, Dr. Pfuhl, of Berlin, accepting the work of Liborius and Kitasato as showing conclusively that very small quantities of lime will destroy the germs of typhoid fever and of cholera, undertook to determine in what form it is preferable to use the lime in the disinfection

of typhoid and cholera stools. His experiments with lime in lumps proved that, in this form, its action is too slow. He then made use of the milk of lime, prepared by slaking one part of pure, freshly burned lime, in four parts of water. This gave a 20 per cent. mixture. This milk of lime, when added in the proportion of 2 per cent. to typhoid dejections containing the typhoid bacilli, or to diarrhoeal dejections sown with the cholera bacilla, disinfected them completely. As, however, commercial lime is often impure, he recommends that a large enough quantity of the milk of lime, shall be added to the dejections to be disinfected, to render the mixture distinctly acid when tested with litmus paper.

In the *Revue D'Hygiene* for this year, Drs. Richard and Chantemesse repeat the experimental work which was done by Dr. Pfuhl, and virtually confirm his results, they also favor the use of lime in the form of the watery solution, and found that 2 per cent. of the 20 per cent. solution was sufficient to disinfect the stools of typhoid fever, cholera or dysentery. For the disinfection of a vault which has been infected with typhoid stools, they advise pouring in the watery solution and stirring to liberate the ammonia which is evolved until the whole contents are distinctly and permanently alkaline as tested with red litmus paper.

It would appear then, from the foregoing experiments, that caustic lime is a valuable disinfectant for typhoid fever stools, and the most trustworthy known, for Richard and Chantemesse in comparing its action with that of corrosive sublimate and chloride of lime, found it much more effective than the former, and more so than even the latter. As a disinfectant, unslaked lime must be used in preparing the milk of lime, and this must be freshly prepared or, if kept in a closed vessel, it may be two or three days old. The carbonate of lime, or lime which has long been exposed to the air, is worthless.

Recently the one thing needing to be emphasized as to all disinfection is, that unless applied with all the details prescribed it too often amounts to but little more than a "quieting charm" with which to allay fear rather than control disease. Yet if used as we have often directed, and in accord with the views of chemists and sanitarians it is a great aid to the limitation of disease.

DISINFECTING PLANTS OR APPARATUS.

No city in England is considered as having a competent disinfecting service unless there is a place to which all soiled clothing, not admitting of washing, can be carried in tight boxes and be there subjected to such heat or steaming as will destroy all animal or veg-

table life, or all the particles related to disease. The Ransom stove, among the first of these contrivances, is still in use, but since it a multitude of other forms of apparatus have been devised, some of which are now available in the United States. A very elaborate description of these can be found in the twelfth volume of the American Public Health Association (1886, pp., 198-228).

Recently the Board of Health of New York City (301 Mott street, N. Y). has had an apparatus constructed for this purpose, which is claimed to be very effective and which is well worthy of examination by the health officers of our cities. We desire especially to urge this matter upon the attention of all of our larger towns as we regard it essential to good sanitary provision against the spread of contagious and epidemic diseases.

COTTAGES AND HOSPITALS FOR CONTAGIOUS DISEASES.

Every city stands in need of some form of Hospital, as one of the appliances for preventing the spread of communicable diseases. The single case or the first few cases of such diseases are to be dealt with promptly and effectually if we would prevent an epidemic. While perfect protection and isolation can often be had in private homes, in boarding-houses, hotels and tenement houses, it is often impossible to separate the sick, except by Hospital provisions. Even smaller towns such as Mount Holly and Asbury Park have found signal advantage in having in readiness a place to which such cases could be quickly and safely transferred.

Each city should own a small piece of ground not closely surrounded by dwellings and easy of access on which two or three Cottage Hospitals can be kept or placed, as circumstances may require. While there should be at least one small administrative building as a permanent structure, it is not now difficult rapidly to add detached pavilions if only the plans and the appliances have been well thought out in advance. In the third report of the Ontario Board of Health is a model of the Canton Hospital at Geneva, Switzerland. Its plan is that of a long, well-covered shed, with ridge ventilation, so provided with side canvas and with apparatus for heating and ventilation as to make it comfortable.

The system of Portable Houses and the many improvements that have been made in Hospital furnishing, and regulation of tempera-

ture render it quite easy to secure, rapidly, additional structures for various diseases if only the land has been secured in advance, some small central building erected and the plan of operation arranged in the minds of the Health Board or by its Inspector.

We call the attention of all of our Health Boards to the importance of timely provision for the separation of contagious diseases, and of being in readiness for prompt action as occasion may require.

VACCINATION.

It is still necessary to urge upon School Trustees, Boards of Health and each family the importance of securing this protection from small pox. The laws as to compulsory vaccination in England serve to bring out an opposition thereto from those that claim it is an infringement of the private rights of the citizen to compel an operation, even of so small a character. Leicester is often quoted as relying alone upon sanitary measurers, but it has been recently shown that its system of notification of disease and isolation is rigidly enforced, and that those waiting upon cases of small pox avail themselves of protection the same as others.

“ In the German Empire during the year 1886, the death rate from small pox per million, living, was 35 ; in cities of the Austrian Empire it was sixty-five times greater ; in Hungarian cities it was four hundred and eighty-six times greater. Of the 155 deaths in Germany, 45 occurred in the interior of the Empire where the community is better protected by vaccination, and 110 in the border lands and sea coast towns where exposure to countries not so well guarded is more direct.”

“ In Paris, where the law requiring vaccination is fully enforced, the mortality from small pox ranges from 136 to 10.1 to the 100,000 inhabitants, while in the principal German cities, where the vaccination laws are rigidly enforced, the death rate is but 1.44 to the 100,000 inhabitants. London, under compulsory vaccination, has a death rate from small pox of but .6 to the 100,000 inhabitants. On the other hand, in the Canton of Zurich, in Switzerland, since the compulsory vaccination law was repealed, in 1883, the death rate from small pox has steadily *risen* from 8 to 85 to the 100,000 inhabitants.

“ A report lately published by Mr. Ritchie, President of the British Local Government Board, with reference to the recent epidemic

of small pox in Sheffield, shows that of the children under ten years of age, 95,000 were vaccinated and 5,000 were not. Among the vaccinated there were 189 cases of small pox with 2 deaths. Among the unvaccinated there were 170 cases and 70 deaths. Keeping these proportions, if all the children in Sheffield had been vaccinated there would have been 200 cases of small pox among them and a fraction more than 2 deaths; if none of the children had been vaccinated there would have been 3,337 cases and 1,330 deaths, 600 times the mortality with universal vaccination."

From every consideration of humanity and citizenship we must continue to urge the necessity of this protection. Physicians are especially referred to the articles contained in our fifth report and to the remarks on re-vaccination in the twelfth report.

RAILROAD TRANSPORTATION AND SANITATION.

The Board has from time to time directed attention to the need of oversight on the part of Local Boards of the conveniences of railroad stations, their water supply and the cleanliness of surroundings. There should at least be yearly inspection. One of our leading railroad companies has issued orders as to the weekly cleansing and disinfecting of cars. More attention is being given to water supply, heating and ventilation, but there is still much room for improvement. Side windows are used far too much for ventilation, to the pleasure of some and the great risk and discomfort of others. There is no reason why other forms of ventilation should not be sufficient.

TRANSPORTATION OF COMPOST.

Many complaints have come to the Board by reason of the transportation in summer of a mixture of various compounds called stable manure, but really a very noxious compost. When left to be carted to farms from the sidings in cities it has proved a great nuisance. The past summer the matter was again more fully brought to the attention of the P. R. R. Company, and much relief afforded by a suspension of the traffic during the summer months.

SANITARY SURVEY.

Many of the States are now conducting sanitary surveys at large expense, because a knowledge of soil, its contour and topography

and its water deposits, etc., is of such great importance, both on agricultural and sanitary bearings. It is the great boon of this State that its admirable maps and surveys give a complete basis for all such inquiries on the part of local authorities.

Prof. George H. Cook, whose loss the Board together with the whole State so much lament, was fully informed as to the great sanitary interests involved and in this and many other ways aided in laying the foundation for effective sanitary administration for the future.

It is now wise that in addition each city should have sanitary maps showing the underground location of all pipes, tubes, sewers, etc. We believe the time will come when many of our cities will construct underground conducts or tramways in which all water, gas and sewer pipes, and electric wires will be accessible, and through which garbage, etc., can be delivered. The possibilities of cleanliness are such as to require the very best constructive methods.

HEALTH INSPECTORS.

Besides the duties which naturally fall to the charge of Health Inspectors, they should be possessed of some special knowledge on the following subjects:

I. They should have copies of, and be quite familiar with the laws of the State as to health; as to vital statistics; as to the sale of meat and vegetables, of kerosene, and as to the more hazardous adulteration of foods.

II. They should have some knowledge of the principles of heating and ventilation, and be able to measure the cubic space of rooms and buildings.

III. A knowledge of the characteristics of good drinking water; the various ways in which it is polluted and how to prevent it; also of various methods of water supply, as by wells, driven wells, reservoirs, pipes, etc.

IV. A knowledge of the laws of drainage and of sewerage.

V. A knowledge of sanitary appliances as used in houses, and of what is good or poor plumbing.

VI. A knowledge of what constitutes a nuisance from any trade or business.

VII. A knowledge of best methods of scavenging and disposing of refuse.

VIII. A knowledge of methods to be used to prevent the spread of communicable diseases.

IX. A knowledge of proper house cleaning and disinfection.

LECTURES ON SANITARY SUBJECTS

While the sources of information as to sanitary matters have greatly multiplied since the Board began its work, the time has not yet arrived when we can trust entirely to general literature or the press for the needed information. There must still be on the part of the State and of Local Boards efforts to educate the people. The facts are with us and must to some extent be with the people in order to secure that legislation and that administration which to a fair degree will be sustained by public opinion. We often have to move against personal interests because it is right so to do. We need to have a constituency with sufficient information to see the need of laws and of their execution, and so to defend action, for this much can be done by popular lectures. There are physicians who have sufficient knowledge and access to sufficient authorities to enable them to be of great use in this regard to the communities in which they are located. After a teacher, an architect or an engineer can do similar services. For the sake of guiding such we here give outlines of a few courses of lectures which have been suggested or delivered.

An outline of a course suggested to the New Jersey Sanitary Association by Dr. W. K. Newton will be found in this last report.

With these as suggestive models, we trust that some good service will be done in this direction in various localities.



SYLLABUS OF LECTURES ON SANITARY SCIENCE.

BY PROF. WILLIAM H. BREWER.

Sheffield Scientific School of Yale College.

"I. Sanitary Science.—Objects and aims of Sanitary Science. Methods of investigation. Relation to the other sciences. Relations to personal hygiene. Three elements determine the health of the individual—(a) Constitution, (heredity); (b) Personal habits and vocation; (c) Surroundings. This equally true of a community. Classification of causes of death. Preventible diseases. Special dangers incident to modern civilization. Achievements of modern sanitary science.

"II. Pestilences, Plagues and Epidemics—The part they have played in history. How they travel and spread. Relations to social and religious life. Relations to commerce. Relations to material prosperity.

"III. The Germ Theory of Disease.—Fermentation, general features; the chemical changes involved; the physical conditions required; putrefaction and associated phenomena; the nature of ferments. Zymotic diseases, general character; infections and contagions; animal plagues. Analogies and theories; microbia. Disinfectants and Antiseptics. Present status of the "Germ" theory. Parasitic diseases.

"IV. Water.—The properties of Water. Requirements of good drinking-water. Mineral ingredients of natural waters. Organic ingredients of natural waters. Gaseous ingredients of natural waters. General relations of each to health. Special infections. Quantities required per person. Methods of purifying.

"V. Decay and its Relations to Health.—" Filth diseases." Gases of decay. Oxidation and Ventilation. Malaria.

VI. Disposal of Filth.—Nature of the filth of civilization. Its general relations to health. Disposal of excreta and slops; sewer-

age, aims and methods; other methods of disposal. Garbage and its disposal. Street cleaning.

VII. Sanitary Aspects of Soil and Air.—Oxygen and its function. Relations of health to the dryness of the air. Relations of health to the dryness of the soil. Relations of health to topographical features. Relations of health to geological features. To heat and light: To climatic conditions.

VIII. Vocations and Industries.—Relation of longevity to vocation. Specially unwholesome vocations. "Poisonous trades." Offensive industries. Effluvium nuisances. Various nuisances incidental to manufactures. Abattoirs.

IX. Food.—Sanitary relations as to kind and abundance. Unwholesome foods. Food adulterations. Special dangers incident to the household preparation of food. Special dangers incident to manufactured food preparations. Diseases of domestic animals in their relations to human food. Milk supply of cities. Cookery in its sanitary aspects.

X. Education and Social Customs.—School hygiene. Sanitary aspects of certain social facts; of fashions in dress; of materials used about our persons or houses. Of the use of alcoholic drinks. Of narcotics. Medical customs. Of divers other social customs and facts. Disposal of the dead.

XI. Healthy Houses.—External requirements. Internal dangers to be avoided. Buildings for industrial or commercial uses. Public buildings. Neighbors, their rights and duties.

XII. Sanitary Administration.—Official sanitation. Boards of health. Quarantine. Unofficial sanitary societies and organizations. Sanitary engineering. Professional sanitarians.

XIII. Conclusion.—Present status of Sanitary Science. Effects on the production of wealth. Effects on life insurance and expectations of life. Its relations to modern sentiments. The growth of Sanitary Literature. Modern civilization and the three scourges, War, Pestilence and Famine.

LECTURE ON HYGIENE.

E. M. Hunt, M. D.

INTRODUCTORY OUTLINE OF THE SUBJECT.

I. Hygiene: Its Relation to Cognate Sciences and Arts; the Scope of the Study, and the reasons for teaching it.

THE EARTH AS RELATED TO HUMAN HEALTH.

II. Its Constituents; Animals; Vegetables; Minerals; Soil; Air; Water; Heat; their Relations and their Effects on Health.

WATER AND ITS RELATIONS TO HEALTH.

III. Its Sources without and within the Body; Air and Gases in Water; Animal, Vegetable and Mineral Matters; Organic Impurities; Sewage; Parasites in Water; Relation to Disease; Rain-water for Drinking Purposes; Cisterns; Surface Water; Springs; Shallow Wells; Deep Wells; Bored or Tube Wells; Reservoirs; Tests of the Purity of Water; How to sink Wells; Lead-pipe; Filters and Filtering; Hardness of Water; Aerated Waters; Ice-water.

AIR, LIGHT, SUN-HEAT, AND CLIMATE, AS RELATED TO HEALTH.

IV. Oxygen, Nitrogen, and Carbonic Acid; Aqueous Vapor; Purity of Air; Amount Needed; Air without Draught; Moisture of Air; Light and Sun-rays; Sun-baths; Electricity; Temperature; Climate and Health; Houses and Clothing as adjustments to surroundings.

THE ANATOMY OF THE HUMAN BODY, AND ITS HYGIENIC CARE.

V. The Bones and their Uses; their Proper Nutriment; Protec-

tion from Distortion and Accident; Effects of Posture and Pressure; the Chest; the Foot; the Effect of Habits; Deformities.

THE MUSCLES.—BODILY EXERCISE.—CALISTHENICS.

VI. Athletics; Gymnastics; Calisthenics; Tendons and Ligaments; Exercise; Body-building; Work; Walking; Bathing; Modes and Apparatus of Exercise.

THE SKIN, ITS FUNCTIONS AND ITS CARE.

VII. The Skin: Its Functions and Care; its Vessels; its Nerves; its Glands; its Structure. Perspiration; Water; Other Excretions; Oil-glands and Hair-follicles; Papillæ of the skin; its Nerve Distribution; the Nails; the Care of the Skin; Bathing; Soaping; Rubbing; the various Baths; Special function.

CLOTHING AND HABITATIONS AS BODILY PROTECTIONS.

VIII. Our relations to Heat and Temperature; Design of Clothing; Effect of Density; Fineness of Thread, Color, etc.; Elasticity of Fiber; Head Coverings; Body Coverings; Feet Coverings; Waterproof Clothing; Bed Clothing.

Habitations: To be valued as Clothing. How made so as to adjust to our surroundings; as to Air; Temperature; Dampness; Dust; Protection from Chilling Draught.

THE BLOOD AND ITS CIRCULATION.

IX. The Heart and its Tubes; its Mode of Action; Course of the Blood; Composition of the Blood; Effects of Alcohol upon it; the Capillary Circulation; the Lymphatics as related to the Blood; Circulation; the Spleen; Air, and Gases in the Blood; How it is Replenished; Effects of Pressure on the Vessels; Hygiene of the Blood as to Food, Exercise, and Right Living; Faintness; Nose-Bleed; Care of Wounds or of Sudden Bleeding.

THE LUNGS AND THEIR RELATION TO HEALTH.

X. Their Capacity; their Bronchi and Air-cells; Formation of Carbonic Acid; Effect of Oxygen; Power of Blood to contain Oxygen; Impure Air; Air as a Food; the Act of Respiration;

Clothing as Fitted to the Chest; Posture in Study; How to Breathe; the Voice and its Health; its Apparatus; How to Care for it; Conditions of Vocal Success.

THE PROCESS OF DIGESTION.

XI. The Relations of the Mouth and Teeth; the Juices of Digestion; Mastication; Air in Food; the Order of Teeth; Sixth Year Molars; the Care of the Teeth; Chyme and Chyle; the Successive Changes in the Digestive Process; Peristaltic Movement; the Liver and Pancreas; Effect of Stimulants on the Digestive Tract; Deceptive Toleration.

OUR FOODS AND THEIR USES.

XII. Their Relation to the Constituency of the Body; Nitrogenous Foods; Carbonaceous Foods; Mineral Foods; Requirements of the Body as to each; Contents of Meats, Vegetables, and Fruits; Tables showing Proportions; Milk, Bread, Eggs, etc.; Cooking of Foods; Starches; Green Vegetables; Potatoes; Principles of Cooking as applied to various Foods; Modes of Preparing Bread; Hygiene of Digestion.

OUR DRINKS, AND EFFECTS OF STIMULANTS.

XIII. Water; Tea; Coffee and Cocoa; Oil in Cocoa; Chocolate; Alcoholic Beverages; Fermented and Distilled Liquors; Varieties of each; Intoxication denotes a toxic; Daily Rations of Soldiers and Sailors; Records of Registrar-General of England; Testimony of Scottish Amicable Life Assurance Society.

Effects on Particular Organs: The Teachings of Hygiene Explicit as to their evil effects; Condiments; Comparison of them; Tobacco and its Effects; the Cigarette.

MODES OF HEATING.

XIV. Radiation; Conduction; Convection; Heating of inside air by Fireplace, Stoves, Radiators, Pipes, etc.; Heating of outside air and introduction by registers; Heating by outside Radiators and Pipes, and Introduction of Air thus warmed; Illustrations of all these; Comparison of them; Consumption of Oxygen; Other Modes of preparing Air; Avoidance of Draught; of Dust; Chimneys; Cowls.

VENTILATION OF HOUSES.

XV. Constituency of Air; Fire and Lights in Rooms; Living Beings; Minute Particles; Dryness of Air; Draught; Windows; Air Space; Natural and Artificial Ventilation: Plenum and Vacuum Methods; Where shall Fresh Air be Introduced? Outline of Regulations; Ventilation by Flues; Modes of Lighting; Gas Lights; Electricity.

THE SCHOOL AND ITS APPOINTMENTS.

XVI. The Grounds; the Building; Drainage; Materials; Damp Course; Entries and Stairs; Doors and Cellings; Floor Space and Area; Window Space and Light; Blackboards; Desks; Height of Seats; Care of Floors and of Walls; Janitorship; Care of Children; of the Skin; the Breath; the Throat; the Eyes; of Contagious Diseases.

WHAT TO DO WITH REFUSE OR CAST-OFF MATERIAL.

XVII. Conditions of Life; Decomposition; Methods of Disposal; Cremation; Use of Water Evils of Filth-storage; Absence of Light and Air and Conditions favorable to Disease; Effect of Varying Ground Water or Decomposable Matter; Person Cleanliness and Perfect Housekeeping; How to Prevent Foul Accumulations; How to Deal with Decomposing Matter; various Disinfectants and Modes of Use.

THE NERVOUS SYSTEM.

XVIII. The Cerebro-Spinal System; the Sympathetic System; the Relations of each; Description of the Brain and Spinal Cord, and of the Nerves as Distributed through the System; Reflex Action; the Nervous System; Education; How we Educate ourselves into Reflex Actions properly or improperly; How we make acts habitual or automatic, and so are trained; Nervous Diseases; Alcohol in its Effects on the Nervous System; Effects of Narcotics; Recreation and Rest; how to Invigorate; Twitching, sobbing; Spasm to be Heeded; Discipline in the Training of the Nervous System; Body as well as Mind need Education; Wholeness of Being to be developed.

THE SENSES.

XIX. Sensations; the Muscular Sense; how the Senses are Re-

lated; Cultivation of the Senses; Sense of Touch; varieties in it; Comparative as to Localities; Training of the Touch; Handiwork a part of Education; the taste; how Touch and Smell modify it; how it can be blunted; Perverted Tastes; the Sense of Smell; its Close Relation to the Brain; the Olfactory Distribution; Effect of Foul Air in Sleep; the Apparatus for Hearing; the External, the Middle, and the Internal Ear; how we may affect Hearing; the Throat; Hygiene of the Ear; Injuries and how to guard against them.

THE SENSE OF VISION.

XX. The Protection to the Eye; its Secretions; how we may Disturb them; Affections of the Lids and Glands; the Structure of the Eye; its Relations to Light; its Chief Affections; Myopia; Hypermetropia; Astigmatism; their Causes; Rules to their Avoidance; Specimens of Type; Artificial Lights; how the Eye is Injured; General Directions as to its Care; Color Blindness.



1

LECTURES ON SANITARY SCIENCE.

DR. V. C. VAUGHAN, ANN ARBOR, MICH.

1. *Chemical Biology*.—(a) The formation of organic compounds in the plant, or food for plants and tissue changes in plants. (b) Digestion, Assimilation, and tissue change in the animal. (c) Physiological growth and decay of the individual.

2. *Foods*.—(a) Varieties and the special adaptability of each. (b) The supply of muscular force and animal heat. (c) Adulterations of Foods; means of detection and methods for the suppression of.

3. *Water and Air Supply*.—(a) Detection of impure water. (b) Methods of purifying. (c) Water supply for farm houses, villages and cities. (d) Baths and bathing. (e) Air supply and ventilation. (f) Laws preventing the pollution of water and air.

4. *Supply of Fuel and Light*.—(a) Varieties of Fuel and Special use. (b) Method of heating. (c) Methods of lighting.

5. *Ferments and Germs*.—(a) Physiological ferments and fermentation. (b) Disease Germs. (c) Filth diseases. (d) Antiseptics and disinfectants and their use. (e) Quarantine, vaccination, etc.

6. *The disposal of decomposing Matter*.—(a) Vaults, cesspools dry-earth closets, etc. (b) Sewerage. (c) Disposal of the dead.

7. Public Nuisances.

8. Influences of occupation upon health.

9. The relations of Meteorological conditions to health and disease.

10. Vital Statistics.

11. Duties of boards of health and health officers.

12. General health laws.

SCHOOL HYGIENE.

A SCHEMATIC VIEW OF TOPICS.

Prof. T. P. Wilson.

A. — GENERAL TOPICS.

1. School Houses; 2. Scholars; 3. Teachers; 4. Curricula;
5. Parents. Trustees.

B.—SPECIAL TOPICS.

1. School Houses. 1. Location; 2. Construction; 3. Management.
 1. Location. 1. Soil; 2. Street; 3. Grounds; 4. Neighborhood.
 2. Construction. 1. Material; 2. Form; 3. Furnishing;
4. Water Closets.
 3. Management. 1. Warming; 2. Ventilation; 3. Light.
2. Scholars. 1. Age of Admission; 2. Years in School; 3. Manners and Hours of Study; 4. Physical Condition.
3. Teachers. 1. Age; 2. Qualifications; 3. Duties.
4. Curricula. 1. Subjects; 2. Time; 3. Mode of Teaching.
 1. Subjects. 1. Literature; 2. Art; 3. Science.
 2. Time. 1. Literature, one-fourth; 2. Art, one-fourth;
3. Science, two-fourths.
 - Mode of Teaching. 1. Text Books; 2. Lectures.
5. Parents. 1. Home; 2. School. Trustees.

Ann Arbor, December 13, 1883.



U. S. NAVAL DEPARTMENT AND LITERARY CLASSIFICATION AND ARRANGEMENT.

A.—DEPARTMENT OF PUBLIC HEALTH AND COMFORT

Class 1.—Local Hygiene.

Sub-class 1.—SOIL:

- a.* Geological and physical character of localities.
- b.* Thermometry.
- c.* Permeability by gases and water.
- d.* Micro-organisms.

Sub-class 2.—ATMOSPHERE:

- a.* Chemical composition.
- b.* Abnormal constituents—chemical, microscopical. How supplied.
- c.* Physical properties—humidity, heat, electricity, winds, weight.

Sub-class 3.—ARCHITECTURE:

- a.* Dwellings.
- b.* Hospitals, medical establishments, infirmaries, asylums, homes, alms-houses.
- c.* Buildings for educational purposes, refuges, reformatories.
- d.* Schools of all degrees, and their equipment.
- e.* Factories, laboratories, (chemical, powder, fire-works), metallurgic works, work-shops.
- f.* Vaults, morgues, mortuaries, burial of the dead, and creation.
- g.* Movable dwellings, tents, shelters.
- h.* Materials of construction, devices.
- i.* Walls, prevention of the rise of damp through foundations and walls.
- k.* Cellars, surface drainage.

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- l.* Wood floors for use without carpets.
- m.* Fire-proof construction.
- n.* Ventilation.
- o.* Heating; grates, stoves, furnaces, steam, hot water.
- p.* Fixtures and fittings connected with water-supply.
- q.* Drainage; disposal of refuse and excreta.
- r.* Defective and ill-constructed traps, pipes and sanitary apparatus of various kinds.
- s.* Materials and appliances for obtaining artificial light.
- t.* Laundry arrangements.
- u.* Floor, wall, and ceiling coverings; tiles.
- v.* Household furniture, showing sanitary advantages and defects.
- w.* Fabrics suited to avoid the harboring of dust, zymotic effluvia, or vermin.
- x.* Culinary utensils and other household requisites from a hygienic stand-point.

Sub-class 4.—TOWNS AND CITIES :

- a.* Streets, roads, parks, etc.; paving.
- b.* Drainage and sewerage.
- c.* Application of sewage to agriculture.
- d.* Water-supply, public baths and laundries; drinking fountains.
- e.* Public lighting.
- f.* Food-supply, markets, dairies, slaughter-houses, hotels, restaurants.
- g.* Steam, electric and horse railroads.
- h.* Water transportation.

Sub-class 5.—SHIPS—WAR, MERCHANT, YACHTS :

- a.* Heating and ventilating.
- b.* Living accommodation.
- c.* Quarters for the sick.

*Class II.—Personal Hygiene.**Sub-class 6.—CLOTHING: To include materials, processes and fabrics.*

- a.* Specimens of fabrics used for clothing, with statements of their relative power of resistance to the absorption or

transmission of heat, their relative flexibility, durability, fast or fugitive color, etc.

- b.* Body garments providing against cold, rain, dry or damp heat, dust, and attacks of insects.
- c.* India-rubber, gutta-percha, and other water-proofs.
- d.* Head and foot coverings.
- e.* Military, naval and industrial costumes.

Sub-class 7.—FOOD: Rather kinds of food. N. and C.

- a.* Food supplied by the animal kingdom.
- b.* Food supplied by the vegetable kingdom.
- c.* Secreted and extracted products.
- d.* Condiments.
- e.* Narcotics and masticatories.
- f.* Beverages and drinks.
- g.* Microscopic preparations illustrative of genuine and adulterated food articles.
- h.* Culinary science and dietaries. Cookery.
- i.* Military and naval rations.
- k.* Personal regimen—exercise.
- l.* Special hygiene of professional occupations.

B.—DEPARTMENT OF LIFE-SAVING AND PRESERVING.

Sub-class 8.—PUBLIC HYGIENE:

- a.* Life-saving from fire.
- b.* Protection against lightning.
- c.* Protection against inundations.
- d.* Protection against explosions.
- e.* Protection against accidents in submarine works.
- f.* Protection against accidents in mines.
- g.* Safety appliances in traveling on land.
- h.* Safety appliances in traveling on water.
- i.* Prevention of the accidents, injuries, and diseases incident to industrial employment.
- k.* Prevention of contagious diseases.
- l.* Attendance to persons wounded in war—ambulance, cots, litters, and other apparatus.

REPORT OF THE BOARD OF HEALTH.

- m.* Attendance to persons accidentally injured in peaceful pursuits.
- n.* Fragments of exploded boilers, heaters, tubes, etc., damaged by pressure, frost, acids, scales, and other deposits, injury by bursting.

GENERAL CIRCULAR.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
WASHINGTON, January 10, 1882.

The Surgeon General of the Navy has established a Museum of Hygiene connected with this Bureau, which the American Public Health Association has made its permanent central repository.

It is intended that it shall exhibit the present state and future progress of the nation in all departments of hygiene, and to carry out this important scheme, the co-operation of physicians, engineers, architects, builders, manufacturers, inventors, and others interested in sanitary matters is not only desirable but indispensable.

Contributions of articles, appliances, models, drawings, etc., illustrating improvements in food, water-supply, bedding, clothing, marine architecture, house and hospital construction and furniture; apparatus for heating, illuminating, ventilation, and removal of excreta and refuse; culinary, laundry, and bath facilities; appliances for physical culture and exercise; and whatever else tends to the preservation of health and the prevention of disease, are therefore solicited.

Contributions of materials and books should be sent to the address of the Surgeon General of the Navy. Donors and depositors will, in every case be duly credited on the descriptive labels of their exhibits.

Respectfully,

PHILIP S. WALES,
Surgeon General U. S. Navy.

CIRCULAR TO NAVAL OFFICERS.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
WASHINGTON, January 15, 1882.

The Medical Officers of the Navy are informed that, in the application of a fund appropriated by Congress for sanitary investigations, the Surgeon General has instituted a Museum of Hygiene connected with the Bureau, which is intended to exhibit the present state and future progress of hygiene. In this undertaking the active interest and co-operation of the members of the Medical Corps of the Navy are expected, and it is desired that they will avail themselves of every opportunity to procure, both at home and abroad, contributions for exhibition of such articles as may have a bearing upon the preservation of health, the prevention of disease, and the comfort of the sick. There are many subjects

which admit of a vast range of illustration, among which may be mentioned: models, drawings, and appliances suggesting improvement in house, hospital, and marine architecture; apparatus for heating, ventilating, and illuminating; collection and disposal of excreta and refuse; food and water supply; clothing; appliances for exercise and physical culture, etc., etc.

Respectfully,

PHILIP S. WALES,

Surgeon General U. S. Navy.

INSPECTION WORK OF THE BOARD.

During the past year the inspection work of the Board has been pursued with renewed diligence and increasing satisfaction. It is evident that from time to time various local boards need to be visited in order that they may be instructed as to ordinances as to modes of procedure and as to the evils which need to be remedied. The State Board is often appealed to in difficulties arising out of attempts to remove nuisance, and not unfrequently is able to secure the desired result without litigation. Where litigation occurs the testimony of the State Inspectors is often of much value. Eternal vigilance is the condition of success in combating the causes of disease, and if pecuniary provision permitted it would be practicable to extend this work considerably. Some special inspection has been made of some of our principal places for summer resort, and of the condition of the hotels and boarding houses open for the reception of guests. So many defects have been revealed that the Board has thought proper to order a special examination and report for the ensuing year. While our resorts will, in their sanitary condition, favorably compare with those of other States, we desire to be able to say more than this.

Our experience with at least one of the seaside resorts has shown the possibility and feasibility of a record which shall tell to strangers the sanitary condition of each house, and so enable them to have a reasonable assurance as to its fitness or unfitness for occupation. The result is a confidence which far more than balances the evil of exposures. More than this, it is a duty we owe to society, and oftener than we think the demands of sanitary law and its enforcement is in the direct line of pecuniary advantage and of steady and prosperous growth.

The sewer systems of the State have been examined during the

year. It is the constant effort of the Board thus to co-operate with all the local boards and thus aid them in their work. Much also is accomplished by the correspondence of the secretary and by information in various ways furnished to local boards. The circulars of the Board, which are always at command, are found very serviceable and are especially called for in times of epidemic.

Under the heading of Circulars and Laws will be found a list of all circulars at present issued and kept on hand for distribution.

CHILD TRAINING AS TO HYGIENE.

There is no more essential and precious guardianship than that which needs to be exercised over child-life. We now speak of it only from the physical side of life. Life and health are the foundation capital and the foundation hope for worldly happiness and prosperity. Wise is that State which early turns its attention to the care of childhood in the home and in the school.

As to the home, the sphere of State influence and control may seem somewhat restricted. But even here, without meddlesome interference, there can be wise supervision and assistance. The State has a right to place limitations upon the degree to which people may be packed in houses or to say that no family of children shall be compelled to be brought up in one room. It has a right to prescribe rules as to admission of air and light, as to space for ingress and egress and for the prevention of accidents.

It must more and more be recognized as a part of governmental administration to regulate the construction of dwellings to the extent required for health. Laws for the prevention of cruelty to children are now well recognized as having their place in codes and statutes, and there is no reason for overlooking those smaller impositions which are disregarded because of their smallness or insidiousness, but which become most serious by reason of their quantity and their continuance.

There is ever need of care that the child be protected as far as the domain of law can reach from all those conditions which tend to interfere with the development of the physical life. For the stamina of the man and the woman are being determined in these growing years, and this means the vigor and welfare of the State as well.

PHYSICAL LIFE IN THE SCHOOL.

Still more time is it that the control of the State has to do with the physical life in the school. Here the State itself takes the child in charge. As its ward, and by the offer of free education, recognizes the essential relation which exists between the two. Society, by the force of events, has been brought to recognize that this education must mean the training of the physical as well as the moral and intellectual natures. Hence the training of the body in all that habit, posture, exercise, development mean, comes largely into the calculation. We are to study the laws of health and to teach them and see them practiced with the same exact assiduity with which we train mind or soul. Hence, the sanitary conditions of all school buildings must be sedulously secured. Sanitary methods must be in operation in lighting, heating and ventilating, in the arrangement of studies, in the admixture of work and play and in all the details of education. It has come to be recognized as an axiom that what we would have appear in the Nation's life we must have appear in its schools. This is especially true in a country like ours where the popular voice and the popular vote, not only make public opinion, but are the real powers of government.

Our public school system, especially, is based upon the fact that education is essential to the prosperity and perpetuity of the State. Lest it should be neglected, the State makes of it a gratuity, and, as far as seems practicable, compels the training and education of the children. Well may this be so when we remember that even every year brings to the ballot-box multitudes of new voters, who if good voters, will express the results of training in the home and in the schools.

How much then depends upon the character of the education imparted? So much over-prominence has been given to mere mental education, that it is necessary to urge the still greater importance of moral and physical instruction. Dr. Lord, in his Roman history, notes the fact that the first signs of the decadence of a nation are to be found in physical changes of the people, and in less tendency to and ability for sustaining occupations. Those who have studied with closest scrutiny the nearly two hundred years of American population, and have taken into consideration the influx

from immigration, are quite in agreement that there has been gradual loss of physical vigor, and that it is high time for us to seek to counteract this tendency by a reconstruction as to our methods of and subjects for education. It is probably the inherent recognition of this want that has led to so great an extension of athletic sports and gymnastic exercises, and has helped to give to instruction and practice in manual labor the prominence of consideration which it is now receiving.

This Board early took occasion to issue circulars upon the subject, and four years since, in conjunction with the Superintendent of Public Institutions, made an extended inquiry into the sanitary conditions of the school buildings of the State. This awakened the attention of teachers and trustees and led to many improvements in the appointments of school buildings. But the subject of which we now speak is one of still greater importance. It concerns that kind of training which the pupil is to receive during his school life, and those methods which shall secure its practical application to his own physical habits. In all our higher and larger schools there is need of definite instruction in hygiene instead of mere advice. Only so much of anatomy and physiology should be taught as are subservient to the teaching and practice of hygiene. Teachers should be examined as to their knowledge of this as of other branches, and should themselves be able to give practice in calisthenics and to direct as to other exercises. Where, as in the ordinary country schools, it is not practicable to have a text book of hygiene, the teacher should be so well versed in the subject as to be able to give short lectures on the various topics which it includes. We know of some instances in our own State where this has been done with great success. Often, too, the physician of the neighborhood may be found available for occasional instruction in this direction. If only the rising generation of children could be educated in what is now known of the principles and practice of hygiene, it would secure a race of improved vigor, increase the working period of life and diminish the number of untimely deaths. The fact that one-half of our children die before six years of age is serious enough. But it is still more serious that this indicates a want of vigor in parentage and in a large proportion of those that remain. If we wish radically to reduce the sickness rate we must secure such manly and womanly vigor as will be more resistful of

disease, or be better able to grapple with it when it invades. We refer our teachers, physicians and people in general to the many articles on this subject in our former reports, and add some in this report, from experienced and accomplished teachers of our State. These will be found to contain many facts and thoughts which should lead to more thorough attention to the subject.

CHARITABLE AND PENAL INSTITUTIONS.

The Board has continued, during the year, an examination into the sanitary condition of institutions. The full report made last year seemed to arouse public attention, and to make many of the officers more watchful as to prevalent conditions. Local boards are also recognizing this as a part of their duty and make occasional examinations. Valuable additional circumspection is given by members of the State Charities Aid Association and its local branches. While its attention is especially directed to personal needs and social questions, it also incidentally aids much in securing cleanliness of persons and surroundings. There remains much to be done in rendering all these various institutions as effective as possible for the purposes for which they are intended. It is the effort of the Board to have as many as possible visited each year, including the township almshouses, which, because of their smallness, often fall into gross neglect.

HEALTH LAWS.

The various laws relating to the public health receive the careful oversight of the Board. Those relating to the adulteration of foods and drugs and to the contagious diseases of animals are now also reached by the service of the dairy commissioner and of the U. S. Bureau of Animal Industry. We still give careful attention to adulterations injurious to health, to complaints as to the sale of poor quantities of kerosene, and as to the disease of horses known as glanders, which is communicable to man.

We had occasion the past year in connection with the serious freshets to call attention to the laws as to drainage. For years some of the mill dams, situated so as seriously to interrupt drainage in inhabited localities are being removed.

Our two principal health laws as found in Circular LX (chap. LXVIII, Laws of 1887), and Circular LXVI, (chap. XXXIX, Laws

of 1888). Attached to Circular LX is a list of various health laws passed from time to time by the Legislature. As a whole our system of sanitary legislation is ahead of its effective administration and forms the basis for excellent sanitary progress.

THE THERMOMETRY OF HYGIENE.

Annual Address of the President of the New Jersey Sanitary Association, held at Trenton, November 22 and 23, 1889.

BY D. BENJAMIN, M. D., CAMDEN, N. J.

[NOTE BY THE SECRETARY.—The address of Dr. Benjamin was without manuscript and was illustrated by various maps and diagrams, so that it can only be reproduced here by abstract. It has been a study with him for a long time. His object has been by actual tests in the sick room to find the varied temperatures at the same time in different parts of the room and at different heights. Results show some surprising variations between the center and sides of the room and between the vicinity of windows and the more remote corners. As currents of air are made by variations in temperature, the bearing of all this on ventilation is easily seen. We believe the paper will be of service in drawing special attention to the subject.]

It gives me much pleasure this evening to address such an audience as this and upon such a subject as Sanitary Science. Surely this is one of the first consideration, and yet there is perhaps no subject to which the masses of the people seem so indifferent. The Thermometry of Hygiene has not been studied, and I could find no literature upon it. Years ago its importance pressed itself upon my attention. The frequency of colds and the tendency of civilization to increase our susceptibility to colds, show that the progress of civilization is towards rendering the human race more feeble, and it is only to the development of human science that we can look to combat these tendencies. Every nation, as it becomes more civilized and enlightened, seems to degenerate until it reaches its declining stage and is marked with decay. Such has been the history of the world, and it is hardly fair to affirm that this age is

an exception to the history of the past. Rome and Greece followed the same course, leading to effeminacy, decay and ruin.

Perhaps there is no class of diseases more common than those of the respiratory organs. Now, what is a cold? appears to be the first consideration. This has never been clearly defined. But we may say it is a congestion and an inflammation. This is mostly produced by some exposure to changes of temperature. The effect is very greatly increased by moisture. A uniform temperature of 70 degree F. is about what a human being can remain in and continue in a normal condition. This in ordinary circumstances, but if we have been overheated and then sit quietly in this temperature, we may take cold. Loss of heat, with dampness and wet feet, results in the leaving of the blood from some portion of the body, and consequently there is an accumulation of it in some other place. This other part is then in a state of congestion. This is the first stage. If reaction can be brought about, the cold may be prevented in many cases. But the majority of colds, croup, etc., are due to the changes of temperature in the dwellings and rooms at home. This has been known, but no satisfactory knowledge has been obtained. Most of the cases are in the house, and persons in the habit of going out will not take cold. They keep in motion and the temperature of the body is even. But in the house the circulation is interfered with.

One physical law is that heated air is lighter than cold air and it will ascend. Therefore the hot air will accumulate at the ceiling, and the floor will remain cold. The second law is that the circulation of air goes on if there are any means within to warm the air or disturb the temperature. That is, if there is a human body in the room or a stove, a constant current of air will be induced. Of course, we cannot live in rooms unless there is an influx of pure air and an egress of impure. It is necessary that currents of air be thrown into the room. Most rooms have no provision for the ingress of air. They depend upon crevices of windows and doors. The cold air works its way in and floods the floor, and the little children on the floor are sitting in cold air, while their parents above them feel a higher temperature. This is mostly due to stoves. A stove requires a constant and larger supply of air, and the air must come in with great rapidity. Some of it is almost as low in temperature as the external air.

In order to ascertain the exact difference in temperature, I procured a number of ordinary thermometers and hung them in different parts of the room. I found that where there are heaters used a different state of affairs exists. The air from the heater as it poured into the room is warmed before it enters, and there is a warm current going out. In heating by steam there is not the ventilation obtained when a stove is used. There is no draft in the room at all. The air in the room is merely heated. Where there is steam heating there must be some system of supplying fresh air in the room, and some exit for the foul air.

(Diagrams were exhibited, showing clearly the action of the currents of air, and how hard it is for children to escape without colds and croup).

No. 1 shows plan of room. The outside air is 24 degrees, while inside at the window it is 40 degrees and ranges up to 80 and 90 degrees at the stove, while in the upper part of the room it is 78 degrees.

No. 2 shows temperature of cellar under the floor as 22 degrees with 50 degrees at the floor, and ranging to 85 degrees at the ceiling.

No. 3 shows 24 degrees outside and 30 degrees at the window inside, with a cold current flowing into the room from the window making 59 degrees at the floor while 71 degrees is marked in other portions of the room. A child standing at the window is in a temperature nearly as low as that outside.

No 4 shows temperature in different parts of a house. Cellar 42 degrees; first floor room heated by a stove, ranges from 48 to 78 at the floor, 32 to 90 half way up, and 80 to 90 at the ceiling. Second floor room heated by a stove, 65 to 68 at floor, 65 to 73 in the middle and 70 to 77 at top. Third floor not artificially heated, 45 to 52 at the floor and 66 higher up.

No ventilation should be allowed to come from open windows. No stream of cold air should be allowed to come in. The opening of church or car windows is a serious source of danger and death that should be prohibited. There should be fresh air, but it should be heated, and not allowed to enter in cold streaks. With steam pipes there should be an ingress of air. It should not come in in solid volumes, but in small streams, and strike the heater.

Sanitary science has a field in which to work, in the State House.

Here it is crippled by political complications. This is specially so in school-rooms.

The ventilation should not be in the top of the rooms. It is a mistake to have the foul air register in the ceiling. The foul air being heavier than pure it should be allowed to pass out near the floor. It will then be forced out by the heated air filling the upper portions of the room, and the whole room will be warmed. (Illustrated by diagram showing true and false methods).

There is no association in this State so potent for good that has done so much to enlighten the people as this Sanitary Association. It is good, of course, to heal diseases, even though sometimes the physician may be paid. But it is a far greater thing to prevent these diseases. The suffering is prevented, the danger avoided and the life prolonged.

No doubt there are thousands now living and millions yet to come who will profit by the labors of this association, though they may not know the source of these benefits. As sanitary science is appreciated these beneficial results must grow. The greatest blessings come to us without a knowledge of their sources. The influences of the sun and the rain, and all the glorious blessings of our lives seem to come in the course of nature, so the blessings of Sanitary Science do not seem to be appreciated by those who are most benefited by them. The indifference of the people is a source of alarm. We have daily evidence of the deadly influences of typhoid fever. Science raises her voice and declares that 99 per cent. of all the cases of typhoid fever come from the drinking water. This is the verdict of the greatest scientists of Europe. In view of the incontestable evidence, if the water supply is pure it may be asserted that you will not have one case of typhoid fever where now you have a hundred. But look at the indifference of the people. Not only is it true of typhoid fever, it is almost equally true of all the other cases of preventable disease.

I urge you to go forward in this good work. Your efforts have already been far reaching, and promise hereafter greater results.

THE EAST ORANGE SEWAGE DISPOSAL WORKS AS COMPARED WITH OTHER METHODS.

*Abstract of Paper read before New Jersey Sanitary Association,
Trenton, November 22, 1889.*

BY C. PHILLIPS BASSETT, M. AM. SOC. C. E.

When the township of East Orange began discussion of available systems of sewage removal, in 1883, they came face to face with a problem altogether new in municipal development in this country. Serious obstacles to a collection of the sewage, due to topographical peculiarities existed, but these problems were almost forgotten in a search for a satisfactory outfall for the collected domestic and manufacturing wastes.

Bordered by Newark, Orange, South Orange and Bloomfield; supplied with excellent water, and provided with many miles of substantial Telford pavements, East Orange was enjoying an area of most prosperous growth and development. But every rise in the wave of municipal prosperity made more urgent the removal of voided and discarded wastes.

How was this to be accomplished? Where were they to be discharged? These were the questions propounded before many a public meeting, and many times to committees in power during the winters from '83 to '86. (a) The sewers of Newark on the east offered possible outlet to the Passaic river. (b) Pumping over the high ridge to the south, and thence to the Newark bay between Newark and Elizabeth was suggested; (c) and schemes for local purification of the sewage were presented. To the first project Newark, through a Common Council committee, said emphatically, No! The sewage of Newark was of itself giving sufficient trouble

in the water supply without accepting contributions from beyond its limits, even for a liberal subsidy. Pumping to Newark Bay involved eight or nine miles of conduit outside of the township across several municipalities, beside the heavy current expenses of pumping and maintenance. Rights of way and legal complications added objections to this plan. Argument, discussion and investigation seemed equally to favor some method of local disposal of the sewage.

I do not understand that the title of the paper allotted to me has been intentionally worded to secure a comparison of the operation of the purification works which have been constructed with results possible by any of the projects originally suggested in East Orange involving a crude discharge of sewage into tidal waters. I interpret the intention to have been to compare the results of the purification process here adopted with other purification processes.

Nor is this an easy task. For it may be stated with perfect assurance that no system of sewage purification has been constructed in this country, up to the present time, which is competent to do the work, under similar local conditions, which the East Orange plant was designed to accomplish. Small available area of land in the midst of a dense suburban population, and a high class of chemical purity in the effluent from the works which flows into a small stream entering the Passaic river close to the water supply intakes of Jersey City and Newark. These were the conditions which the works were designed to meet.

The aim of this paper will be to give in outline an accurate account of the success and shortcomings of the works as constructed and operated, and then outline the conditions under which the principles involved may be introduced with advantage into new work.

A brief explanation of the system will be of service. (For further description and plans, see "Engineering and Building Record" and "Engineering News" for January, 1889.)

The sewage enters the works in a 2 x 3 feet new form, egg-shape, brick sewer, terminating in a conduit of rectangular section having lateral projections, extending nearly to its centre on alternate sides, at intervals of three feet along the axis.

In this conduit, chemicals from the building unite with the sewage, the lateral projections of the carrier give a whirling motion to

the sewage, which causes a complete mixture of chemicals with it. The carrier now leads the sewage to the precipitation tanks. The tanks are constructed in duplicate, one set being cleaned or lying idle while the other is in use. A brick wall, located ten feet in front of the inlet to the tanks, checks the velocity of entrance flow. A board floating on edge in vertical guides intercepts the lighter floating matter and insures their saturation before passing it, at a depth from the surface of 30 feet. The cross-walls in each tank divide it into three compartments; over these the flow passes with a depth of about 2 feet, the heavier matters settling and being intercepted; with a continuous flow of low velocity in the tanks the surface water is being constantly skimmed off into the carrier, leading to the irrigation ground. Drums float a swivel-arm in each compartment which connects with a low-service pipe in the bottom of the tanks and discharges on the surface of the ground at a low level. These arms draw water only from the surface, but the drums falling with the water enable any arm to empty the compartment in which it is located to within eighteen inches of the bottom into the low service carrier leading to the surface of the ground.

The effluent from the precipitation tanks, after entering the carriers, is distributed over the surface of the filtration ground and descends to the under-drains which are from three to five feet deep and twenty feet apart over the entire 14.7 acres in the works.

The sewage effluent is applied to the land on the principle of intermittent downward filtration, the flow being applied successively to different areas. Part of the land is laid off in beds four feet wide, separated by shallow furrows in which the water flows, soaking laterally into the beds. The remainder of the land is divided into flat beds, 100 feet long by 50 to 100 in width, over the whole of which water flows. This latter method is preferable where the coarser matters are removed from the sewage before it passes onto the land.

Italian rye-grass has given the best results on the land, and is now grown almost exclusively. Farmers from the neighborhood cut the grass and remove it as necessary, but up to the present time the town authorities have not been able to secure a satisfactory return from its sale.

Returning now to precipitated matter or sludge in the tanks; after the supernatant water is drawn off through the swivel-arm, a

valve-gate is opened and the sludge drawn into the deeper sludge-well within the building. By forming a vacuum in a cast-iron receiver which is connected by an iron pipe with the sludge-well, the sludge is drawn up in the receiver; milk of lime being drawn in at the same time by a small pipe from a mixing tank in the chemical room. This lime prepares the sludge for pressing, cutting it so that the water separates more readily from the solids.

A pressure of 100 pounds per square inch is secured in one of the other receivers, and, being connected with the receiver containing the sludge by an air transfer-main and the proper valves opened, the sludge is forced into a Johnson filter-press and pressed into moist, hard, portable cakes.

The machinery used in manipulating the sludge was constructed by S. H. Johnson & Co., of Stratford, England, who have erected numerous plants in England. Their machinery is the subject of several patents and no similar devices are manufactured in this country. Water for dissolving the chemicals enters by a pipe from the town water mains. Air from a compressor is blown in at the bottom of the tank and the active agitation rapidly dissolves the chemicals. The outflow of chemicals to the sewage is regulated by gate-valve. At present about 2.5 grains of lime and 1.0 grain of sulphate of alumina are added per gallon of sewage treated. The sewage is highly diluted with a large flow of ground-water taken into the twenty-six miles of sewers in the town—more than twelve miles of which are constructed in a saturated subsoil.

The filter-press consists of thirty-six cast iron cells, supported on a simple frame, with a central feed-passage into which the sludge is forced from the receivers. The cells are separated by canvas bags, and in the intercellular spaces the sludge remains while the water is strained out through the canvas into a trough on the rear of the press and returns to the tanks. On the end of the press is a capstan screw connected with a thrust-block which presses the thirty-six cells of the press into close contact. It is the air pressure which separates the water from the sludge.

There is nothing offensive about these cakes when pressed dry; and, if protected from water after being taken from the press, may be kept in bulk for weeks without nuisance. But, in the presence of heat and moisture, they become more or less objectionable.

At present between six thousand and eight thousand people are

contributing to the sewage, and about ten tons of sludge-cake are taken out each week. Some of the sludge cake has been sold at fifty cents per load, but more has been given away in the hope of creating a demand for it among neighboring farmers, while a large amount has been carted away by the authorities when no other removal offered.

It seems here desirable to introduce a summary of the processes of purification which are operating on the sewage as it passes through the works.

As the sewage enters the tanks, matters in suspension by their own gravity tend to deposit; this tendency is fostered by the arrangement noted of the cross walls and floating interceptors. The coagulated film formed by the chemicals entangles finer suspended particles and enticing other matters from solution, settles or is precipitated in the tanks.

The effluent water from the tanks is spread out over the surface of the ground in their streams. Coming in contact with vegetation, some of the water is absorbed through the large bulbed roots of the grasses, and more or less aeration of the water; resulting in the combustion of nitrogenous matter; occurs in its flow through the carriers and over the land.

The soil acts on the effluent water first as a mechanical filter, straining out finer matters in suspension; it next performs the work of dividing up the water into minute particles and prosecuting an increased surface to the oxygen contained in the pores of the soil, oxidation or combustion of organic matter here takes place.

Until recent years the processes at work on the sewage water were traced no further than this point, but the enunciation of the germ theory of disease and the careful study by biologists and microscopists of this subject have made clear another agent, more powerful under favorable conditions perhaps than all others combined.

Microscopic life, scavenger bacteria, is found at work in the soil near the surface devouring and destroying with wonderful rapidity under favorable conditions nitrogeous matters entering the soil. The results produced by these agents is called "nitrification," and is, perhaps, the safeguard of the land treatment of sewage. All these agents, comprising all that is practically applied in sewage purification works, are at work in the East Orange plant. Rough

sedimentation, coagulation and preceptation, oxidation and intrification are each allotted duties in the proper operation of the plant. Better results could be obtained by calling out more nearly the full efficiency of each than is obtained at present. But the works have accomplished an important service. They demonstrated the practical operation of the processes of purification to an unbelieving public; they have made a sewerage system possible in an important residence district of the State, and they have pointed out difficulties which could hardly have been foreseen and fortunately indicated the methods of their solution. All this they have accomplished with abilities of the work never called out by vigorous maintenance.

The expense of maintaining the works is about fifty cents per head of contributing population; this amount may be somewhat reduced when a larger part of the population of the township is connected with the sewers.

Mention has been made of the unusually large percentage of the sewers throughout the township which are under water pressure. The intricate topography of the town made several heavy cuts—in some cases over 30 feet—necessary. In all these deep cuttings the water level is now far above the sewers; a head pressure of over 20 feet occurring in several places. In addition all the mains located in the valley lines were constructed in a quicksand or running sand formation. Under these circumstances, despite the greatest care and much expense, a considerable volume of ground water finds its way into the sewer pipes. When it is remembered that there are over 2,600 joints per mile, some of them over six feet in circumference, the practical impossibility of making actually impervious sewers under the conditions named with vitrified pipe and cement becomes apparent. But this flow from the 25 miles of pipe sewers was limited to a very small volume, probably about 2.5 gallons per second.

It was necessary however to build the outfall sewer with a size beyond the maximum vitrified pipe and a brick sewer was therefore constructed for 2,000 feet through a difficult formation, a timber cradle being used under the sewer.

In another section of the town a tunnel, at a depth varying from 25 to 35 feet, was driven for about 2,500 feet to avoid the interference with surface travel incident to so tedious a work in open

cut. The great difficulty experienced in controlling the large volume of water encountered at this depth practically prevented the construction of an impervious sewer in this place, where the tunnel was lined with brick.

From these two pieces of brick sewer less than a mile in length about five gallons per second enters the sewers—twice the quantity, it will be noted, entering the remaining 25 miles of pipe sewers.

This aggregate flow of 7.5 gallons per sec. (650,000 gallons per day), mingles with the house sewage (about an equal amount), becomes sewage and must undergo the purification processes.

To relieve the filtration grounds, which have rather a retentive soil, from the heavy tax of passing this million and a quarter gallons per day, several artificial filter beds of coke and gravel were constructed and have been of material service, performing the work excellently. Obviously the more labor of purification performed in the tanks the less remains to be accomplished on the land.

On account of the small quantity of chemicals which are being added to the sewage, the coagulation and precipitation is much less effective than could be secured (at an added cost) and the land is called upon to do rather more than its equitable share of the purification.

I have nothing to do at present with the management of the works—they having been turned over to the authorities last spring—but I understand that the Committee having the works in charge are satisfied with the present results obtained with the small amount of chemicals mentioned. It should, however, be understood that much more efficient precipitation may be secured when it is deemed desirable.

No well-founded complaint has been raised against the works since they were placed in practical operation, although they are closely surrounded by several dwellings.

Naturally, however, objection exists in the minds of some to the “suggestiveness” of the works, and for this reason considerable pains were taken to make them attractive to the eye. They were, and I believe are, pleasantly referred to by the residents as “Franklin Park.” Experience in the operation of these works suggests several conclusions.

The purification of sewage is a burden to the tax payers. Under almost no conditions can it be done at a profit; there are, however,

almost no conditions under which it cannot be accomplished without nuisance and at a justifiable cost if no satisfactory crude disposal is available. The maintenance expense under trying conditions is here established. In most of the towns of the State it would be much less.

Sewage purification is a burden. Sewage is an evil to be gotten rid of in the best manner possible. But what are the conditions under which purification is desirable? That is the question that might have driven the Sphinx into silence ; but it demands a reply. Inland towns in this State and throughout the country are waiting the answer.

The question does not interest alone the town seeking a sewage outlet, it involves the public weal.

The human nature of a municipality if left to itself may be relied upon to shift the evil of sewage discharge from its own door to the threshold of its neighbor. Illustrations where the sewage of one town becomes the drinking water of another, are but the evolution of the earlier relation to the well and the neighboring cesspool. Nothing but the power of the law can prevent this "touch of nature."

This anomolous mixture of sewage and potable water is apparent everywhere, and yet it has produced but a small effort to prevent it.

As a nation we have been prodigal of our inheritance. We have neglected the lessons of older people.

It will not do to argue that because sewers pollute streams therefore we must go back to, or perhaps cling to, the cesspool and leaching vault. Some communities are thus arguing with dogged persistence. But the value of the modern sewerage system is demonstrated, it remains to secure relief from the pollution of streams which it threatens.

But who is to decide upon the needs of purification or the merits of a crude discharge of sewage in the different cases that arise. It would seem that these questions could not be safely left for decision to the populations directly interested. Some competent authorities should be vested in them these powers.

In England the Local Government Board is judge, while in Massachusetts the State Board of Health controls. The latter method if competent and unprejudiced supervision is secured,

promises the best results and is here suggested as desirable in our own State.

Dilution, subsidence and oxidation are looked upon as the three chief causes of transformation in the organic wastes entering rivers. From one hundred and forty to one hundred and eighty cubic feet per minute is generally considered to be sufficient flow in a stream receiving the sewage from one thousand people to render it inoffensive to populations living along the stream within a few miles of the pollution where it is not used as a potable supply.

The rapid subsidence in streams of slow velocity enables them to free themselves from a large percentage of the matters in suspension within a few miles (the distance being dependent on the specific gravity of the matters in suspension and the velocity of the stream) of the pollution.

The improvement in rivers immediately after fouling, due to these two causes, appears in some cases to have been overestimated. Drs. Letherby, Odling and others in England, have asserted that if the dilution is at least twenty times the volume of the sewage the organic matter will be rapidly oxidized and will be entirely destroyed in a dozen miles or so. Belief in this theory has resulted in serious consequences. The English River Pollution Commission, however, stated in 1878 that there was no river in England long enough to completely destroy sewage matter discharged into it. Some considerable "personal equation" must be allowed in these results; and a middle ground is more defensible than either extreme.

Every gallon of filth taken out of a stream makes its purification by natural means so much easier, and streams receiving only purified sewage effluents in place of crude sewage would have far less difficulty in digesting and eradicating the dangerous elements now threatening.

Along streams used as public water supplies and at the same time as outlets for sewage, requirements of purity in the sewage effluents should be established in accord with the results of available processes, and where necessary, populations required to subject their water supply, taken from such a stream, to a process of artificial purification.

Potable streams should be defined and classified; and, when a complete examination of any water-shed indicates that a stream or

any part of a stream should for any reason be finally abandoned as a potable supply, provision for a proper supply for the populations using such a source should be made and ample notice given that they may effect the needed changes.

If such a policy were inaugurated, radical improvements in present methods of sewage and water purification to meet the added needs would certainly follow. The extra expenses incident to the plan would be amply justified in a saving of life and an increase of efficient and vigorous health. And in this particular it may be stated that the sanitarian never fears a fair comparison of the cost of removing unsanitary conditions with the cost of retaining them.

A review of the legal decisions against river pollution even under present imperfect laws, shows that the courts are very emphatic in protecting a public water supply. And, although comparatively few actions have been taken considering the very general practice of stream pollution, it seems probably that in the near future the subject will receive more of the attention which it merits.

THE SEWER SYSTEMS OF NEW JERSEY.

BY A. CLARK HUNT, M. D., SANITARY INSPECTOR.

Year by year the importance of definite plans for the removal of sewage is becoming more and more recognized. It will be remembered that last year, under the direction of the Board, examination was made of the public water supplies of the State with a view of ascertaining their source, their general character, the condition of reservoirs and conduits, and the extent to which the supply was used in its particular locality. During the past year, as far as other duties would permit, a similar investigation has been made into sewer systems. This was felt to be important because of the variety of systems employed in the State (see report page—), because of the needs of some of our cities and the active discussions of methods, and also because in the examination of water supplies, it was found that in so many instances householders still depended on former methods. It is useless to attempt to make cities healthy by a good public water supply and by good sewer systems if half of the citizens will still drink the water from wells located in filth-sodden ground or fill their rear yards with cesspools, instead of connecting with the sewers.

In the process of investigating the sewer systems the following questions have been used as a guide.

1. Name of city or town.
2. Population.
3. When built, who designed.
4. By whom owned.

5. Is stream water separated.
6. System of disposal, describe outlets.
7. Sizes of intercepting sewer, of laterals of branches of house connections.
8. Length of system, miles of pipe.
9. Material and shape of construction.
10. Maximum and minimum grades.
11. How flushed, any other method of cleaning.
12. Average depth below street.
13. How is subsoil water dealt with.
14. How is roof water dealt with.
15. Number of connections.
16. Dry weather flow of outlet sewer.
17. Have you printed reports.
18. Frequency of manholes, how many.
19. Is there any other ventilation by shafts, etc.
20. Are sewers deep enough to drain cellars. Are they laid straight from manhole to manhole.
21. Are intersections on a level with mains.
22. Does ground water enter the sewers.

The following is the list of towns reported:

Asbury Park,	Atlantic City,
Camden,	Cape May,
Elizabeth,	East Orange,
Englewood,	Gloucester City,
Hackensack,	Jersey City,
Long Branch,	Mount Holly,
New Brunswick,	Newark,
Ocean Grove,	Passaic,
Paterson,	Princeton,
Perth Amboy,	Rahway,
Trenton.	

NOTE.—Salem is introducing a system. Riverton has decided upon a sewer to be introduced in the spring. Plainfield and Orange have the subject under consideration.

ASBURY PARK.

The winter population is 3,000. During the summer the average for three weeks is 40,000. Upon certain days when excursions

come in the number of people in the city is as high as 80,000. The sewer system was constructed in 1879. Mr. Barmore planned the work. The system is owned by Mr. Bradley.

Storm water is excluded. The sewage is emptied into the ocean. The intercepting sewer empties into a receptacle or pit, which is 60 feet long by 22 feet in width, and $6\frac{1}{2}$ feet in height. From this two vents of 26 inch pipe rise to a height of 75 feet. The pit is connected with the ocean by a twelve inch pipe, which is protected with a gate for emptying at set times. From the ocean side of the gate a pipe leads back to the pit, and this, with each wave impulse, the air is driven over the sewage and up through the vent shafts. In this manner efficient ventilation is secured. The outlet is 400 feet from the pit and the sewage is disposed of without any trouble. As the system is made up of small pipe it is necessary to provide each connection with a catch basin having a grating, so as to intercept all floating material and secure the more perfect breaking up of matters in suspension.

These gratings are cleaned from time to time as necessity requires.

The intercepting sewer is 12 inches in diameter.

The branches are 4, 10 and 12 inches, and the house connections are 4 and 6 inch.

The length of the system is 15 miles.

The pipes are terra cotta.

The average grade is 3 feet to the 100.

The minimum grade is $\frac{1}{2}$ inch in 100 feet.

This grade is carried over a distance of 3,400 feet and the pipes are very carefully laid.

The system is flushed by household use ; formerly it was artificially flushed, but this is at present unnecessary.

There is no other method of cleaning.

The depth of the sewers is from 15 to 18 inches. Both subsoil and roof water are excluded from the system.

The flow has not been computed but the pit when full can be emptied in 38 minutes. There are no printed reports of the system. In addition to the large stacks for ventilating the pit air shafts are in use in many localities.

The house catch basins are also ventilated. Cellars are not drained by the sewers, except in a few instances. The pipes are

laid straight from manhole to manhole. Branch pipes enter with their upper borders on a level with the upper border of the intercepting sewer.

All connections are made under supervision, and a permit is required. There are 750 connections.

ATLANTIC CITY.

The permanent population is 12,000. The sewer system was built in 1880 by Messrs. Robinson & Wallace, and is at present owned by a stock company. It is the separate system, surface water being excluded. From the various portions of the city the sewage flows into a well at the pumping station, which is located at the foot of North Carolina avenue. The well is twenty feet in diameter; from it the sewage is pumped to a filtering bed which is located well out on the meadows. After passing through the filter the effluent is carried by under-drains into a stream called the "Beach Thoroughfare." The main is twenty-four inches in diameter. This was formerly built with terra-cotta pipes, but as there has been trouble from breakage whenever it is necessary to repair portions of the pipe iron pipes are substituted. The laterals and house connections run from 12 to 6 inches in diameter. There are about 15 miles of pipe. The system is flushed by the liquids entering it and no artificial flushing is used. The greatest depth of the sewer below the street is 16 feet. The sewer, in some places, is within 12 inches of the surface, but as frost does not give any trouble, it is permanent and in no danger of breakage. Roof-water goes upon the streets and does not enter the sewers. There are a few man-holes on Pacific avenue wherever there has been trouble from clogging. Only a few cellars are drained by the sewers. The pipes are laid straight and with even grades. A new filter bed is being built 1800 feet out in the meadows. The effluent is not clear, but the beds remove the larger suspended matters. There are 1125 connections and the people are rapidly learning the value of the system and availing themselves of it. It seems to answer every purpose and it is hoped that in time all those using cesspools will connect with the sewers.

CAMDEN.

Has a population of 75,000.

The Federal street sewer was built in 1860.

The city owns the system.

Both storm water and household waste are received.

The outlets are into Cooper's Creek and the Delaware River.

The largest sewer is 6 feet in diameter.

The egg-shaped are 3 feet 4 inches by 5 feet 6.

The smallest built sewers are 12 inches in diameter.

The majority are 2 feet in diameter.

The smaller pipes run from 12 inches to 4 inches.

There are 33 miles of pipe.

Eighteen feet is the greatest available height above outlet. Some 1,000 feet along the river front is almost level. The average fall is 1 foot in 100 feet.

There are but few terra-cotta sewers.

The sewers are flushed by storm water.

The older sewers need frequent cleaning on account of lack of pavement in some of the streets.

The depth of the sewers is from 5 to 9 feet.

The old sewers were laid with loose bottom for drainage. The new ones are tight.

A printed report is published. The number of connections is not computed. Man-holes are located from 150 to 200 feet apart. Perforated covers are used. All branches are carried to the tops of the houses. Sewers are laid straight with even grades. Intersections are always 56 inches above the flow. 1,000 connections have been added each year recently. Permits are issued, but there is no supervision of the way connection is made. Connections are now compulsory. The greatest difficulty met with is the slight elevation, which makes it almost impossible to drain some of the cellars in the lowest part of the city. These sometimes contain water, especially after heavy rains and during high tides.

CAPE MAY.

The sewers have been constructed about 20 years.

There are no maps of the system existing.

The sewers were not, at first, well laid, but extensions and repairs have been carried on with more care.

All the sewers are of terra cotta pipe.

There are two miles of pipe, the largest being 14 inches in diameter, the smallest 8 inches. House connections are of 6 inch pipe.

Connections are made by individuals, and the number is said to be 350. Manholes are not frequent or at bends.

The city engineer is in charge of the system.

The discharge is by two openings into tidal creeks. One of these has recently been dredged and straightened, and thus the out-fall flow has been increased.

Storm water is received into the sewers.

The grades are slight but seem to be sufficient.

ELIZABETH.

Population is estimated at 35,000

The sewers were built in 1866, and are owned by the city.

They were designed by Ernest L. Myer.

Both storm water and household waste are carried. The outlets are into Staten Island sound at different points.

Some of the outlets empty into the Elizabeth River. The largest sewer is 7 feet in diameter and is circular. The smallest pipe sewer used is 15 inches in diameter. There are 33 miles of sewers. The larger sewers are built of brick and are all egg shaped with the exception of the main circular sewer. The sewers are flushed by storm water and hydrants. The large sewers are cleaned by entry through the manholes. The depth of the sewers below the street averages 11 feet. There is no especial provision for subsoil water. Both roof and surface water is allowed to enter. Nearly all houses on the line of sewers are connected. The Board of Health requires this. There is no printed report. The manholes are every hundred feet apart. Ventilation is secured by the manhole openings.

Cellars are well drained.

The sewers are laid in straight lines from man-hole to man hole with even grades.

All connections are made at an angle where possible, and under the supervision of a licensed sewer inspector, who gives a bond of \$500 to carefully make all openings into sewers and drains with due regard to sanitary regulations. The average grade is two feet to the hundred, and in small pipe, from six inches to a foot per 100 feet.

EAST ORANGE.

A full report upon the system at present in use will be found in the preceding article.

ENGLEWOOD

Has a population of between 4,000 and 5,000.

The sewer system was constructed in 1887.

A company known as the Englewood Sewage Company own the plant.

The separate system is used.

Mr. Bassett planned the system and superintended the construction. The outlet of the sewer is half-way between Englewood and Nordorf into a tidal creek.

The pipes are from 12 to 4 inches in diameter.

The pipe used is the vitrified pipe.

The minimum grade is 1 in 300, the maximum is 50 in 100

Eighteen flush tanks holding 350 gallons each flush the pipes at regular intervals.

The greatest depth of the pipes is 14 feet. No roof or rain water enter the sewers. There are 179 connections. Manholes are every 300 feet. Reports are printed each year. Perforated manhole covers serve as ventilators. The pipes are all laid straight. Laterals enter above the flow in the large pipes. A citizens' sewer company has a 12-inch pipe running down Palisade avenue to the creek. It was intended originally for cellar drainage and it is hazardous to use it for other purposes, as the joints are all open and no provision is made for ventilation or flushing.

GLOUCESTER CITY.

Population, 8,000. Sewers introduced in 1889.

The system was planned by Fowler & Loomis, of Philadelphia. The combined system is used. The outlets are into the Delaware river at high water mark. There are three outlets. The main sewers are 4 feet in diameter—299 shaped and laid with dry courses at the bottom. These run through Hudson, Mercer and Market streets. There is also a 12 inch outlet in Monmouth street. The laterals run from 12 to 24 inches in diameter, and are of cement pipe. There are 5 miles of pipes. The sewers are flushed by storm

and waste water. Some of the grades are very slight, the lines being almost on a level for short distances.

The sewers are six feet below the street surface. Manholes are 100 feet apart. Cellars are drained into the sewers. There are but few connections as the system is just nearing completion. It will be a great improvement to the city and should result in increased healthfulness.

HACKENSACK.

The sewers were introduced in 1871. Mr. Bacot planned them. The outlet is into the Hackensack River at low water mark.

The sewers are through Bridge and Anderson streets. The Bergen street sewer is two blocks long. The Anderson street is three blocks long. The sewers are 6 feet in diameter, made of brick. They are made of this size on account of the larger quantities of surface water they are compelled to carry. The laterals are 3 feet brick sewers, through Main and State streets. The pipe laterals in Union and Park streets are all 18 inch pipe. House connection are of 6 inch pipe. There are at least 200 connections. The average grade is 3 feet in 100. Manholes are 50 feet apart. The sewers are dry laid at the bottom. They are cleaned by manual labor. Permits are given for connection and the street superintendent has charge of the services. The lower part of the city is sewerred for its entire width. The Hackensack creek has 119 sewage connections. This should be changed and all such connections be made with a sewer so that the creek may not be a menace to the health of the inhabitants.

JERSEY CITY.

Has a population of 175,000.

The sewers are owned by the city.

Both storm water and sewage are received into the sewers.

The outlets are from 1 to 2.5 feet below mean low tides.

The main sewers are from 42 to 54 inches in diameter.

The branches are from 12 to 36 inches in diameter.

The house connections are from 6 to 12 inches in diameter.

The system is about 57 miles long.

The spurs are both circular and oval in form.

The grades are from 8 feet per 100 to 1 inch per 100.

The sewers are cleaned by manual labor.

The depth below the street varies from 8 to 12 feet.

The bottom of the sewers is laid dry, and thus much subsoil water enters.

Roof water is discharged into the sewers.

There are 17,800 connections.

There are printed reports. Manholes are located every 100 feet. Cellars are drained by the sewers.

The sewers are laid in straight lines with even grades.

Connections are made about half way between the top and bottom of the sewers.

LONG BRANCH.

The population is estimated at 7,000 in winter and 30,000 in summer.

The sewer system was introduced in 1885, and is owned by the Long Branch Sewer Company.

It was designed by C. P. Bassett. of Newark, N. J.

The system is the separate one, excluding surface drainage.

The outlet is by an iron pipe, secured to a jetty in the sea, and is carried out 200 feet.

The intercepting sewers are of pipe running from 24 inches to 15 inches in diameter.

The laterals are from 8 to 12 inches in diameter and the house connections are 6 inches.

There are 12 miles of pipe.

The pipe used are of iron and vitrified terra-cotta.

The pipes are flushed by water from hydrants through the manholes.

The average depth below the streets is eight feet.

Roof-water enters the sewers at the heads of the lines.

There are at present 370 connections.

In summer 500,000 gallons flow from the sewer in 24 hours, in winter 200,000 gallons. There are manholes about every 300 feet, with lampholes at various points for examinations. The manholes are fitted with ventilated covers, which have under them a catch basin to intercept sand and dirt.

The sewers are laid deep enough to drain cellars and have even grades.

The system also includes treatment works, where the sewage is filtered through coke, after being treated with chemicals.

The sludge is forced into a receiver, and thence into a Johnson's Filter-Press, which presses the solid material into cakes for removal.

An arrangement is made by which the treatment works may be avoided, and when the filters are not in use in the building the sewage flows through by gravity to the tidal chamber. The system gives satisfaction and the outlet is not a source of complaint, although it opens near the pier and at a point where surf bathing is indulged in.

MOUNT HOLLY.

The population is estimated at 6,000.

The sewers were constructed under the supervision of Mr. Gaskill. The plans were submitted to Mr. Waring and approved of by him.

They were completed in 1888.

The township owns the system.

The system employed is the so-called separate system.

The outlet is into the Rancocas Creek at high water mark.

The main is 2,000 feet in length on Mill street and is 10 inches in diameter.

The laterals are 6 and 8 inches in diameter.

The house connections are 5 and 6 inch pipe.

Permits for connection with the sewers are issued by the township committee.

All connections are made under supervision.

A Y is placed at every house and vacant lot with a stopper where it is not needed.

The system is $3\frac{1}{4}$ miles in length.

The pipes are of terra cotta with both open and cement joints. The grades runs from 1 in 50 to 1 in 350.

The Fields flow tank, with Col. Waring's improvement is used at the heads of the laterals. There are 12 of these used. They are set to flush twice in every twenty-four hours. Each of them discharges 150 gallons at each flush. For the purpose of inspection and determining stoppage branches are put in every 200 feet. A standing Y is inserted and ahead of it a T, with the stand pipe coming to the top of the ground.

The average depth of the sewers is 5 feet, in laterals, in some places it is but 2 feet, but this is where streets are to be filled in to a fixed grade, and in these places the pipes are concreted for protection against breakage.

Some fifty houses have roof water pipes connected with the sewer. Surface water, rain, water, etc., is led by drain tile into Buttonwood run.

There are 160 house connections.

The flow is not determined. No ventilation is provided. Most of the cellars drain into the sewers in the line.

The sewers are laid straight with even grades. Laterals enter the main at an angle of 45 degrees.

The lateral is always the height of the pipe above the main sewer.

The system seems to be working nicely, and will certainly be a source of greatly increased safety and convenience to the residents. There are many still unconnected with the sewers, but applications for permits are steadily increasing.

NEW BRUNSWICK.

The system was introduced in 1881. At least, the commission was then appointed. Sewer District No. 1 was completed in 1874.

A plan was prepared for District No. 2, but it has never been carried out.

District No. 1 includes Hiram, Bayard, Burnett, Nelson, French, Prospect, Somerset, Hardenburgh, Hamilton and Canal streets. The system is owned by the city and was designed by Mr. Ryan. It is the combined system, receiving both storm and waste water.

The outlets are into the canal; there are two of them. The main outlet is at the foot of Albany street. The main sewer is 60 inches in diameter. The large size is due to the greatly increased flow down the hill during large storms. The laterals are from 12 inches to 24 inches in diameter. The main is an oval brick sewer and the laterals are pipe.

The grades are not exactly known.

The sewers are flushed by rain water.

They are from 5 to 8 feet below the surface of the street. There is no provision made for dealing with subsoil water. The number

of connections is not known, but nearly all private residences on the lines of sewers make use of them.

There is no printed report.

The manholes are upon an average 100 feet apart.

The only method by which the sewers are ventilated is through the manholes.

The sewers drain cellars along the route, but during times of freshet the cellars on the lower streets are not drained on account of the backing up of the water and the large amount of water coming from the higher portion of the city completely filling the sewers.

All pipes are, where possible, laid on straight lines with even grades.

The laterals enter the main sewer on a level with the average flow.

System needs some changes and the sewerage of district No. 2.

The emptying of the sewers into the sluggish water of the canal is not satisfactory, and a plan has been proposed of carrying it under the canal by means of a syphon and emptying it directly into the Raritan river. The river, although not a deep one, would probably take care of all the sewage if it were emptied into the channel, as it is a tidal river and also subject to large freshets.

NEWARK.

Has a population of 180,000.

The sewers were commenced in 1854 and there have been continuous extensions to date.

The city surveyors have had the matter in charge.

The sewers are owned by the city.

The combined system is used.

The outlet are into tide water, and into the Passaic river.

Some of the sewage is conveyed by open ditches into Newark Bay, and the remaining portion emptied into the Passaic river.

The intercepting sewers is 6½ feet.

The laterals and branches are of terra cotta pipe, from 10 to 18 inches in diameter.

The house connections are of 6 inch pipe.

There were to January, 1889, 47½ miles of brick sewers, which, together with 30 miles of pipe, makes 77½ miles in all.

There are 1600 basins and 17 flush tanks.

The sewers are egg shaped and oval.

They are all flushed by storm water and tanks.

The average depth below the street is 10 feet.

There is no provision for the disposal of subsoil water.

A yearly report is made of work. Manholes are located about every 150 feet, and the more recent ones furnished with perforated covers. Cellars are drained by the sewers. The new sewers are laid straight with even grades.

Intersections are on a level with the flow. Ground water enters by leakage and absorptions. The system is sufficient but is to be wondered at that so few comparatively avail themselves of it. There should be some method devised by which all those in the lines of sewers should make connection.

OCEAN GROVE.

The sewers were built in 1885, and were planned by Mr. D. H. Brown.

The system is owned by the Ocean Grove Association. Storm water is separated. The sewage is discharged into the sea.

The intercepting sewers are 12 inches in diameter.

Laterals and house connections are 6 inches in diameter.

There are 12 miles of pipe.

The material of the pipes is circular tile.

The grades are from 4 to 18 inches in 100 feet.

The sewers are flushed from the public water supply. The depth below the street varies from 4 to 9 feet.

Roof water flows upon the surface.

There are 764 connections. There are no printed reports. The flow from the outlet sewer is not known. There are manholes at every crossing. Cellars are not drained by the sewers. Intersections are on a level with the mains. The outlet is a 12-inch wrought iron pipe, supported on piles extending out about 200 feet. There is no method adopted to prevent the tides from backing up the sewer, and as the outlet is below low water, at high water the sewer water fills the pipes for about one-quarter of a mile. This is obviously wrong and should receive immediate attention.

PASSAIC.

As the question of the right to sewer into the Passaic River is still before the Court of Errors and Appeals, the full plans for sewerage of the city have not been as yet carried out. The city is now engaged in constructing a small section of the River street system, (Col. Waring's small pipe system being used), and also a large brick sewer 3 feet 3 inches by 4 feet 10½ inches for carrying off the storm water and for draining cellars and the subsoil. The length of the pipe sewers under construction is 4400 lineal feet and of brick sewer 2350 feet. The latter was designed by Messrs. Wise and Watson, who are in charge of all the construction.

The large sewer will probably be extended ½ mile. The population of Passaic is now not far from 12,000. The sewers are put in by the city. The average depth below the street is 7 feet for pipe sewer and 13 for the brick sewer, so that it was not originally intended for Col. Waring's system to drain the cellars. House connections are 4 inches in drainage, but will in future be 6 inches, and connections are placed opposite each 25 foot lot. Manholes will be located not further than 200 feet apart and lamp-holes will be located between each manhole. The flush tanks, which are now being put in, are the "Van Vrankin Tank." This or some other may be adopted for permanent use. The pipes are laid in straight lines. The intersections of the small lateral sewers are above the grade line of the mains. It is to be hoped that the system planned will be in the future fully carried out.

PATERSON.

Has a population of 80,000.

The sewers were commenced in 1868 and have been under the direction of the various city engineers.

They are owned by the city. The combined system is used. The sewers are circular and egg-shape.

The sewage is emptied into the Passaic river. The larger sewers are 72 inches in diameter and the smallest are 12 inches.

The house connections are 8 inch. There are 24 miles of pipe. The large sewers are built of brick; the smaller are of vitrified pipe.

The grades are from 2 inches in 100 feet to 8 feet in 100.

The sewers are cleaned through manholes and at catch basins.

The average depth below the street is 10 feet. The subsoil water is carried off by stone wall and cement inverts.

Roof water is received into the sewers. Nearly all houses on the lines of sewers are connected.

There is a yearly report made but only of new work.

Sewers are ventilated through manholes and basins.

Cellars are drained into the sewers.

The sewers are laid straight with even grades.

Intersections are always in the direction of the main sewer flow.

PRINCETON.

The sewerage system of Princeton College was instituted in 1880 under a commission appointed by the trustees, consisting of Dr. Janeway and Dr. Hunt, Secretary State Board of Health, who selected the late E. S. Philbrick, C. E., of Boston, to design and superintend the carrying out of the system.

It provides for the sewerage of all the buildings then existing on the campus, except the School of Science, which is otherwise provided for, and admits of being extended to the new buildings now in process of erection. It consists of about 4,600 feet of very choice six inch Akron pipe (salt glazed) leading from the different buildings to the sewage field. Originally intended to be a separate system in the strictest sense of the term, it was provided at the upper ends of the branches with flush tanks, into which the sewage was received, and from which it was syphoned periodically into the sewer by the aid of tumbling buckets. Latterly, however, the water from the roof of the new chapel has been admitted into the system, not from any necessity, however, but merely as a convenient means of disposing of the roof water. The cleansing of the sewers still continues substantially by the operation of the flush tanks. But once a year, just before the opening of college in the autumn, the lines are thoroughly flushed with clean water. It is hard to estimate the number of persons served by the system, owing to the fact that so many students lodge in the town, but from 600 to 700 would probably be a fair estimate.

The flow of the sewers varies at present from 7,000 to 10,000 gallons per diem. But in order to account for so slight a discharge, it is necessary to add that only four private houses are connected

with the system; that all kitchen and laundry work for students is carried on outside of the college premises; that chamber slops from the dormitories are carried by hand to hoppers outside of the college buildings, which form the upper terminal^s of the sewer branches, and that all fixtures for supplying students with water for drinking and washing are portable. The result is that, although there is a very liberal use of water in the baths, water closets, etc., the absence of supply and waste piping throughout the dormitories leads to a very great economy of water.

The sewer pipes are of plain pattern, *i. e.*, laid with sleeves. They were selected with extraordinary care; even the pipes remaining after the completion of the work, and which, therefore, include many rejected lengths, have only in rare cases as great a difference as one-eighth inch in the diameters.

Each pipe was bedded for about two-thirds of its length on a narrow bed of cement mortar (about three trowels full) and the joints were made in the usual way with split collars and mortar. The care with which all materials were selected and the sewer pipe laid is shown by the fact that no surboil water has ever been observed in the sewers.

The different lines are laid straight, with even grades varying from $1\frac{1}{2}$ per cent. to 7 per cent., and all deviations have been made in the manholes, which also serve as ventilators of the system. The distance between manholes, owing to the configuration of the grounds, varies from 150 feet to 300 feet. For the same reason the depth of the sewer below the surface is very variable (from 3 to 10 feet), the average being about $5\frac{2}{3}$ feet.

The storm water from the roofs and from the larger part of the roads is carried off to a neighboring brook through an independent system of pipes (designed by yours truly).

The sewage field proper occupies about four acres of a sloping field on the southerly slope of the college grounds. The soil consists of about six inches of black soil resting upon a homogeneous clay subsoil. The entire area is underdrained to a depth of four and a half feet with two-inch drain tiles laid thirty feet apart. Ordinarily, only a little more than one acre is occupied by the sewage, which is applied from a line of troughs at the upper margin of the area. Intermittency of application is secured by throwing out of line one trough, or section of the carrier, every day.

During the past two years it has not been found necessary to move the line of troughs to a new place. During that time, therefore, the area occupied has been receiving and disposing of sewage at the rate of about 7,000 gallons per acre per day. The operation has been in all particulars satisfactory.

PERTH AMBOY.

The population is given as 6,331. The sewers were first built in 1859 through Smith and State streets to the river. The city owns the system. Storm water and household waste are both received.

The main sewer through Washington street, and from the Central Railroad to the sound is egg shaped, and is $4\frac{1}{2}$ feet in diameter. The small sewers are pipe, and mostly put in by private enterprises. A second sewer drains Gorden and High streets, and empties into the sound. The Fayette street sewer is large and is finally intended to drain the tenement house district. The Jefferson street sewer is too large for the drainage area.

The Commerce street sewer is 3 feet in diameter and runs from State street to the sound, and drains 40 acres.

The Buckingham avenue sewer is a 3 feet 6 inch sewer, and 2 feet 4 inches for 700 feet, thence 2x3 feet for 1900 feet. The two are connected by 658 feet of 12 inch pipe sewer. The only small pipe connections controlled by the city are those coming from the school house.

A new sewer is being constructed running through State street, Railroad avenue and Hall avenue, which will drain about 80 acres. House connections are not supervised. There are $4\frac{1}{2}$ miles of sewers. The city engineers from time to time have planned and supervised the work. Running north and south the minimum grade is 3-10 to 50, and the maximum 8-10 to 50.

The sewers are flushed by storm water.

The streets running to the sound fall 40 feet to 1600. Some of the sewers are 12 feet deep. Subsoil water flows into the sewers without any special provision. Roof water flows into gutters and cisterns. Nearly all houses on the line of flow are connected. The flow from the outlet sewers has not been completed. There is no printed report. The manholes in the old sewers are far apart. In

the new they average 150 feet and have perforated manhole covers. There is no effort toward ventilation. Cellars in the line of sewers are drained.

The sewers are laid in straight lines and near bends the manholes are only 100 feet apart. The grades even. Laterals enter below the crown of the upper arch.

RAHWAY.

Has a population of 8,000.

The sewers were constructed from 1867 to 1874, including the various extensions.

The city engineer at that time supervised the work. The system is the combined system, in which both rain water and waste water is received.

The outlets, seven in number, empty into the Rahway river.

The sewers can empty freely except in cases of heavy freshet or very high tides.

The main sewers are 5 feet 6 inches in diameter.

None of the city pipe sewers are less than 12 inches in diameter. Nearly all the sewers are made of brick.

The house connections are of 6 and 8 inch pipe. The length of the system is 9 miles.

The main sewers are oval, but some of the smaller ones are egg-shaped. The flow is always uninterrupted. The sewers are flushed by rain water. The catch basins are regularly cleaned. The depth of the sewer varies from 5 to 23 feet.

Subsoil drainage is provided for by laying the bottom of the main sewers dry.

The number of connections is not known, but nearly all on the lines of the sewers avail themselves of the privilege of using them.

No reports are printed. The manholes are from 100 to 300 feet apart. Ventilation is secured by manholes only. All sewers drain cellars. The sewers are laid straight with the curves at corners as gradual as possible. All house connections enter the middle of the sewers.

Permits are issued allowing parties to tap the sewers. There are some portions of the city needing sewers, such as through Bond street to a low point north of Grand street, and also through the

Main street ditch, but taking it altogether, the system is quite complete and satisfactory.

TRENTON.

A system of sewers is at present being introduced and will in time be extended so as to include the larger portion of the city. It is being constructed upon the separate plan with outlets into the Delaware river. The work has been necessarily slow on account of the underlying rock. At some future time a full report will be made, when the plans have been more fully carried out.

It will be seen that many of our cities are thus provided with systems of various kinds for dealing with sewage and we may draw the following conclusions :

I. It is more and more evident that water carriage for sewage *i. e.*, some system of sewer connection and discharge is the means to be adopted in all growing cities.

II. The variety of methods and the increasing cheapness of material makes it feasible even for smaller cities early to adopt some method for dealing with sewage.

III. The choice of method depends on locality, contour and so many other details that experienced engineers should be called upon to decide as to choice of system and to supervise construction.

IV. In some instances land disposal is necessary, in others the use of chemicals or a combination of the two. Occasionally the best use to which a river or stream can be put is as a conduit for sewage. In other cases these streams must be carefully protected for water supply.

V. In all cases sewers need frequent examination and the use of mechanical or other methods for cleaning, and great care should be used in the methods by which house connections are made.

Under the new plumbing law it is possible to see to it that such connections are made properly, and it would be well if each city Board of Health should have reports made from time to time as to the condition of the sewers in their cities.

In many of our cities although sewers are provided, very few avail themselves of them. Compulsory connection with sewers in streets where they are laid should be obtained, and an ordinance by the local Health Board to that effect would make a vast improvement in many localities.

TUBERCULOSIS.

BY S. G. DIXON, M. D.

Professor of Hygiene, University of Pennsylvania.

In speaking of this disease I do not intend to discuss the question as to whether or not it is an affection essentially general and constitutional, an alteration of the humors and a disease of the blood, nor whether the tubercles that form in the lungs are secondary or whether or not the Koch bacillus causes the primary lesion. We do know that tuberculosis is constantly associated with the presence of this micro-organism, which either by its own initiative powers or by means of the product of its activity, causes the formation of the bodies called tubercles within the texture of the body. We know that it makes its entrance from without and that as a rule when injected into the lymphatic system, it travels infectively through it. From the fact, then, that the tubercle bacillus is so closely associated with phthisis it behoves us as sanitarians to study the source of this micro-organism and the channel through which it enters the animal system.

As early as 1846 Klencke insisted upon raw milk from tuberculous cows being a source of phthisis. Koch claims that the bacillus in man is identical with that of the bovine tubercle bacillus. On the other hand, Klein will not acknowledge the identity of the respective tubercle bacilli, claiming that the morphological characters and distribution are quite different. My experience bears out Klein in his claim that the bovine tubercle bacilli average larger

than the tubercle bacilli found in man. This, however, I attach little or no importance to, as my recent result shows conclusively that the bovine bacillus when grown under certain conditions changes its morphology. The more marked granularity of the bovine tubercle bacillus is accounted for by the different temperatures under which it is grown. Even should the respective bacilli taken from the cow and from man be identical in their morphological characters, we have no direct proof that tuberculosis is transmitted from the cow to man. To decide this Prof. Crookshank is now running a line of experiments which tend to show that tuberculosis is communicable from man to cattle. Last summer he obtained sputum containing numerous bacilli from man in an advanced stage of phthisis, which he shook up with a sterilized salt solution and injected it into the peritoneal cavity of the calf. In a few weeks the animal showed marked signs of illness, looked dull, did not feel well, had a slight cough, and showed less inclination to move than usual. These symptoms gradually increased, and death occurred 42 days after inoculation. Extensive lesions were discovered at the post-mortem examination. The mesentery was adherent to the abdominal wall at the seat of the inoculation and to the rumen; the liver was adherent to the diaphragm. There was extensive tubercular deposit at the seat of inoculation, and an abscess the size of a walnut. Extending over the mesentery from this point there were hundreds of wart-like, fleshy, new growths, some quite irregular in form, others spherical or button-shaped. There were similar deposits on the under side of the liver, on the spleen, in the gastro-splenic omentum and on the peritoneal surface of the diaphragm. The spleen was adherent to the rumen, and on dissecting away the adhesions another abscess was opened. On the under surface of the liver was a third abscess, about the size of one's fist, which burrowed into the depth of the liver substance. The kidneys were very firm on section. The lungs were congested and the pleuræ thickened. On microscopical examination extremely minute tubercles were found disseminated throughout the lungs and liver. Long beaded tubercle bacilli were found in these organs and in the peritoneal deposits. The pus from the liver abscess contained streptococci. The calf died from pyæmia, a result to be anticipated if sputum be employed for inoculation, but sufficient time had elapsed for pronounced local infection leading to acute miliary

tuberculosis. Prof. Crookshank also obtained milk containing bovine tubercle bacilli, mixed it with bran and fed it to a rabbit. In four weeks there was commencing emaciation; later diarrhoea set in, and death occurred exactly 58 days after administration of the milk. At the post-mortem examination the mesenteric glands were found to be much enlarged and caseous. A cover-glass preparation from a crushed gland revealed numerous tubercle bacilli. On opening the intestines there was a patch of ulceration showing the point of access of the bacilli. From these results we must greatly suspect the power of bovine tubercle bacilli to infect man with tuberculosis. Yet my experience goes to convince me that cow's milk is not responsible for quite as much infection as the profession has been inclined to credit it.

First.—Fewer animals are affected with tuberculosis than are reported. Actinomycosis is often mistaken for tubercular phthisis. The reasons for which are obvious. A few days ago I held a post-mortem on a cow that had been condemned for tuberculosis. Her physical appearance was certainly that of a tuberculous animal. After I failed to find any tubercle bacilli, Prof. Huiedkoper, of the Veterinary Department of the University of Pennsylvania, sliced the lungs and found traumatic inflammation, caused by what I believe to be an osage orange twig about three inches long, which had evidently worked its way down through the bronchus and on down to the base of the lung.

Secondly.—I have never found tubercle bacilli in cow's milk unless the animal was suffering from tubercular mammitis, and even then the proportion was small. Drs. Woodhead and McFadgean, of Scotland, after carefully examining six hundred cows as found in the dairies supplying Edinburgh with milk, detected tubercular mammitis in thirty-seven animals. They only found a few tubercle bacilli in the milk of six animals. The milk of these six cows was mixed with the milk of five hundred and ninety-four others. Further, we know that milk kept at the temperature it is usual to submit it to, is not propitious for the propagation of tubercle bacilli.

Thirdly.—It is an undeniable fact that a large proportion of mankind can resist or overcome the injection of tubercle bacilli unless given in great numbers. Otherwise but few of us would escape this dreaded disease.

Fourthly.—If the ingestion of cow's milk was a frequent cause of

tuberculosis in adult man we would likely find the primary lesion in the digestive track. Clinical experience has not shown this to be the case.

Fifthly.—Clinical research does show frequent cases of tuberculosis in children where the abdominal glands appear to be the seat of the primary lesions.

Dr. Woodhead has been a careful observer in this regard. He states that he has often observed in children who died of other diseases tuberculosis of the abdominal glands when there were no traces of tubercular disease in other parts of the body. But notwithstanding all this, from the facts and observations mentioned, I must conclude that it is probable that udder tuberculosis can be communicated to man. And from the fact that primary lesions of this disease are often found in the digestive tracts of children, we should take every precaution possible to guard against this probable cause of phthisis. Dairies should be often inspected and all tuberculous animals condemned and killed.

Moreover, we as sanitarians should recommend the sterilization of all milk from public dairies immediately before use, whether it be from the cow, ass or goat.

From what I have said of primary tuberculous lesions not having often been noticed in the digestive track of man, I do not wish you to imply that I am satisfied in my own mind that such lesions do not frequently exist; for I do think that we will hereafter be able to demonstrate that many ulcerations of the oral cavity heretofore and at the present time diagnosed as carcinomatous are of a tubercular character; and if this should be satisfactorily demonstrated, we may then in all justice hold that milk is a medium responsible for many of these primary lesions. To be sure, milk will only deserve a small share of the censure. Underdone butcher's meat and poultry, the air, drinking water and even the tooth-brushes kept in a family tray come in for their share. Only a short time ago I reported a minor experiment which went to show how possible it is for a consumptive member of a family to inoculate his kindred. I took a new tooth-brush, sterilized it, and had a girl in an advanced stage of tubercular phthisis brush her teeth with it. Then I rubbed the bristles of the brush over a couple of cover-glasses and submitted them to carbol-fuchsine, nitric acid, etc., and mounted them on slides. When examined under the microscope I found a num-

ber of tubercle bacilli. Had this brush been placed in a family stand or tray with its bristles in contact with those of other brushes, one can easily picture another member of the family inoculating himself by brushing his poisoned brush over an abrasion or simple ulcer in the oral cavity, or even upon a carious tooth. Just here I may say that such local seats of invasion should yield to surgical interference. In fact, any superficial inoculation not entering the circulation system is, I believe, curable; for it must be remembered that the tubercle bacillus as we now know it is not motile. Further, it is quite possible that such inoculations lose their virulence before they reach the systemic circulation. I have been able, as you may know, to cultivate under certain conditions tubercle bacilli morphologically different from those generally recognized as the bacilli of Koch. From the conditions under which I produced this changed form I have every reason to believe it is a degenerate one.

I have carried this change to a stage when the resisting power of Guinea-pig tissue will resist it for months, if not altogether. And most interesting to relate, these same pigs will, after inoculation with this attenuated virus, resist virulent virus for months, to say the least.

Even should I fail to produce tolerance to the tubercle bacillus, we will have left one new fact that will hereafter assist us in searching for sources from which the tubercle bacillus may come or in which it may be playing an important part in destroying animal life. Not only must the form described by Koch be looked for, but also the forms as described in my article in the "Medical News" for October of this year. Again, from the fact that the newly discovered form has been produced from the Koch bacillus by time, a change of pabulum, variable temperatures and a dry medium, it should be a hint to us that it might be well to place our phthisical patients under such conditions as will not supply from without a constant supply of fresh germs, and to keep up the vitality of the general system and thereby enable it to outlive the bacilli already lodged therein, when possibly the granulating tissue will become connective tissue as it sometimes does in tuberculous joints, forming a practical cure. Further, it might be well, if possible, to have the bacillus in pulmonary consumption brought in contact with a dry, cold and pure air.

Not wishing to lead myself into a clinical discussion, I will re-

frain from saying more upon this subject on the present occasion, but will take pleasure in showing a slide of the tubercle bacillus in its newly discovered morphology.

DISPOSAL OF TOWN REFUSE OF ALL KINDS.

BY E. M. HUNT, M. D., SEC.

It must ever be a question in all populous cities how best to dispose of the refuse, garbage and all the various decomposable matters incident to life, as it exists in crowded populations.

It is at once admitted that the natural process would be to return them to the soil and follow nature's methods of giving them up as foods for vegetable life. We are so conservative in this direction that we believe no feasible effort should be left untried to imitate and accomplish this order of nature. But the conditions of life in crowded cities is so artificial and the accumulation of all refuse or offalings from city life and all its concentrated industries is so enormous that the financial part of the problem can not but enter as one of controlling considerations in the question of practical disposal. Most of all, the question must arise and be answered how to handle as well as dispose of the material with the greatest regard to the interests of *health*. There are three *axioms*, none of which must be disregarded without the most apparent and defensible necessity.

The first is that all such materials amid close populations must be handled and disposed of before decomposition has been set up. Even voided secretions are, in their health aspects, totally different from those which have been retained so as to undergo decomposing or putrefactive changes. The same is true of all the accumulated debris incident to civilized, industrial and crowded life.

The second axiom is to keep it as dry and cool as possible, since moisture and heat are the only forces that hasten decomposable

matter through its various processes. Therefore we are not surprised that eminent authorities enter their protest against all systems of wetting and storing decayable matter, and that even the advocate of water carriage or sewers are compelled to justify the addition of water on the ground that it is the most speedy way of carrying out the first axiom, viz., the removal of the material while yet in its fresh state, to some distant place.

The third important axiom is never to mingle and accumulate various kinds of offalling or refuse when they can be kept separate. Both quantity of accumulation and variety of material greatly complicate the practical question of disposal. The householder who burns all house dust, refuse, dried peelings of vegetables and fruits in the kitchen stove, who keeps the ash heap free from all other refuse, and who pours the house slops about the vines or the flowers and removes at suitable intervals the dry contents of the outhouses has no very complicated problem on hand. But let all these be indiscriminately mingled, and not only bulk but the variety of the decomposing mass has much complicated the disposal. (See on this subject Circular LXI of this Board)

In some of the smaller cities and in a city situated like Newark, with low meadow dumping grounds near at hand it is possible to dispose of much of the refuse as a filling up of low ground. Even then there should be separation of the grosser and more decayable masses, and some attention to the reducing of the water level of the ground. Some careful experiments by Burton Sanderson and Dr. Parkes as to the changes in the dumping grounds of Liverpool, showed that the forces of nature were active in recovering such material. If only it was not dumped in deep heaps, but on dry ground and fully exposed to air and to the influences of the upper soil. From two to three years is the usual time that should elapse before a deeper covering than three feet is allowed. All agree that it must be removed outside of the city limits. Even with dumping grounds there will remain some material to be disposed of in a more radical way. Besides there are many cities so situated that there is no suitable suburban place of disposal within distances easily accessible.

It is not surprising that fire should be thought of as the most ready and efficient destructor, and as offering the most radical and

efficient method where the two great powers of earth and air are not adequately available in the interests of health.

Hence the most advanced of ancient cities had its Gehenna and its perpetual fire was a sanitary provision.

There have been various imitations thereof on a smaller scale all through the ages. One South American city, Rio Janeiro, driven by the indications in times of pestilence, has for more than a score of years had its perpetual burning of refuse a few miles out of the city.

But it is the advance of science and art that has especially suggested and practicalized this method. So soon as the Siemens furnace was invented and its principles came to be applied in various forms for the cheap and rapid reduction of materials by concentrated heat, the question naturally arose whether the same mechanism could not be applied to the destruction of decayable matters.

It was not long before various inventors were in the market with varieties of furnaces adapted for this purpose.

It is a sufficient evidence of their success that some form of these incinerators or destructors is successfully in use in many of the chief towns of England, such as Bradford, Leeds, Nottingham, Newcastle-on-Tyne, Manchester, Warrington, Derby, Birmingham, Southampton, Nelson near Burnley, and at several points in London, and more recently in our own country. They certainly furnish the most economical way for the disposal of refuse. In populous towns no other method of removal can be adopted at so small an expenditure, and in time, no doubt, some way will be found even for the utilization of the heat evolved in the process. (See Sanitary Record, April 15, 1887, p., 567). In many cases, the garbage, etc., is passed through long chutes for assortment before passing into the furnace.

There are about 100 in all now in use in England. The first trial was at Manchester in 1873, but improvements since 1880 have multiplied them. Mr. C. Jones, of Ealing, England, has recently well discussed the subject before an association of municipal sanitary engineers, in a paper on "Refuse destructors in use in England." (See Sanitary Record, July and August, 1887, pp. 77, etc.) He contended as a result of his own experiments that every town supplies sufficient dust bin refuse to destroy its own sludge, including

sewage refuse, and that there is no difficulty in dealing with town refuse effectually and economically in this way.

The paper was fully discussed by various persons in different localities who had seen the operation of these furnaces. Fryer's Destructor (1876) was among the first used and most of recent inventors have profited by it. It was first used at Nottingham and afterwards at Birmingham, Leeds and Bradford. That of Young, at Glasgow, which I have examined, adopted the air-blowing system. The most recent in England is the Jones Destructor, at Ealing, a suburb of London. It is an improved Fryer's Destructor. It deals with the sludge of a population of 19,000, and the house refuse of 22,000. This is comparatively a new attempt so far as sludge or pressed material of sewage is concerned. Dr. Sicly has said that in his opinion the destructor had reached its highest perfection at Ealing where the sludge was mixed with the house refuse.

In other forms of destructors while there have been complete destruction within economical limits, there have been occasional complaints of odors from the chimney. In the Ealing destructor a "fume cremator" is attached so that increased heat and economy of heat are secured, with a thorough destruction of noxious gases. Vensholine also reports the plan thoroughly successful. The cost is stated at 9d. or 18 cents per ton, apart from the cost of carriage. (See Sanitary Record, August and September, 1887). The following outline gives the present status of the method in England:

It appears that the first attempt to burn house refuse in closed furnaces was made about the year 1870, but those constructed at that time did not prove a success, and were consequently soon afterwards pulled down; and it was not until the year 1877, after many experiments and failures, that furnaces were erected in a sufficiently perfect form to be capable of consuming the ordinary midden and ashpit refuse. The first of the kind were erected at Manchester, and were arranged in pairs back to back. They were each 8 feet 6 inches long, 4 feet 3 inches wide, and 6 feet 3 inches in height from the fire-bars to the crown of the arch. The bottom was formed with a hearth 3 feet in length and fire-bars 5 feet long, and it was made to slope downwards towards the furnace doors, the fire-bars being at the lower end.

At the back or higher end of the furnace an opening was formed, from which the smoke and vapors passed into the flue, which was connected to the main flue leading to the chimney. The top of the destructor was made flat, and is used as a platform on to which the refuse to be burnt is tipped, from whence it is fed into the

middle and hottest part of the fire through a hopper formed in the top of the furnace.

The refuse was satisfactorily disposed of in those furnaces, although no attempt is made at any previous drying of the material; the quantity consumed being at the rate of about $28\frac{1}{2}$ tons per furnace per week.

About the same time—viz. 1877—Leeds took up the question, and erected one of "Fryer's Destructors," which consisted of six cells or furnaces arranged in a double row of three, back to back, in a similar manner to those at Manchester, but they differed in construction in some material points. The area was about the same, but the height of the furnace was reduced to 3 feet 6 inches, and the bottom was divided into three parts, the lower consisting of fire-bars 5 feet long, the intermediate being a drying hearth 4 feet long, and the upper part what may be termed a feeding hearth. The fire-bars and drying hearth have an inclination of 1 in 3, and the feeding hearth is somewhat steeper. The latter extends across half the width of the furnace only, and is situate immediately under the refuse feed-opening at the top of the furnace. In the other half is an opening in the back of the cell leading to the flue—a wall separating the opening provided for the admission of refuse from the one formed for the outlet of the products of combustion into the flue.

An inclined roadway leads up to a platform level with the top of the destructor, on to which the refuse is tipped and shovelled into the feed-openings, which are kept filled with the material to be burned. This slides forward upon the sloping hearths, and is partially dried by the heat given out by the burning material lower down the furnace. This form of furnace was a distinct advantage over any other furnace that had been erected up to that time, as of course, considerably more material could be consumed when partially dried than when in a wet condition. The quantity disposed of averaged about 34 tons per cell per week.

In addition to the ordinary feed-openings, a larger opening, with a cover, is provided over the middle of the furnace, through which infected bedding, unsound meat, &c, can be put direct into the hottest part of the fire, and at once consumed.

These furnaces were so successful in their operation that numerous other furnaces were soon invented, and amongst those which have been tried are "Healey's," erected at Bradford, the "Beehive," invented by Mr. Stafford, erected at Bumley, Leicester, Richmond, and one or two other towns, and the "Nelson Town Refuse Destroyer," the invention of Messrs. Richmond and Birtwistle, erected at Nelson.

I do not think any very useful purpose would be served by describing the construction of these furnaces, as neither "Healey's" or the one at Nelson appear to have got beyond the experimental

stage, whilst the "Beehive" has been abandoned at those towns where it has been tried, except at Bumley, where it is still in partial use for burning shop and market refuse at night time three times a week.

Since the destructor at Leeds was erected others of the same kind have been constructed in towns in various parts of the country, and the experience gained from the working of these under varying conditions revealed certain defects, which gave rise to complaints from those living in the neighborhood of the destructors. One of the principal grounds of complaint was the escape of dust and charred paper from the chimney, which afterwards settled in the immediate vicinity of the works. To remedy this defect the main flue under the cells has been enlarged, so as to form a chamber about 9 feet wide and 6 feet in height. Low walls of dry brickwork, about 2 feet high, are constructed across the chamber at intervals, which serve to prevent the passage of the dust into the chimney, and wire screens fixed across the flue have prevented the escape of charred paper.

The amount of dust collected in the chamber varies in different destructors according to the composition of the refuse burnt, but, as a rule, the chamber requires to be cleaned out at intervals ranging from one to two months.

Since these precautions have been taken no further complaints have been made, and there need be no reason for such complaints if ordinary care is taken to clean the chamber at proper intervals.

The only other material cause for complaint was the offensive smell which sometimes proceeded from the chimney. This smell, do doubt, arose from the vapors given off from the refuse whilst it had been drying, and before it had reached the fire. The wetter refuse being nearest the opening out of the furnace into the flue was, of course, in the most favorable position for the escape of the vapor at once into the flue in an unburnt condition, which gave rise to the complaint I have referred to.

To remedy this evil Mr. Charles Jones, Assoc. M. Inst. C. E., surveyor to the Ealing Local Board, has devised an additional furnace called a "fume cremator." This furnace is about 5 feet long by 4 feet wide, and is built into the main flue in such a manner that all the gases and vapors from the destructors must pass through the furnace on their way to the chimney.

The furnace is heated with selected material from the refuse or with coke at a cost of a few pence per day.

The fume cremator has now been in operation in connection with Fryer's Destructors for some time at Ealing, and no complaints of anything offensive have been made since it came into use, and the result of analysis of the gases passing from the chimney proved them to be perfectly innocuous, and it is now an accomplished fact that towns' refuse may be disposed of through the agency of the

destructor combined with the cremator in such a manner as to be absolutely free from any nuisance whatever. * * *

Recently Dr. MacLintock, the Health Officer of Bradford, England, (pp. 229-721), has reported on the successful use of Fryer's destructor, to which Jones' cremator and Horsfall's steam injectors have been added; the result of the use of the two latter being a great increase in the heat of the furnace and its more effectual consumption of the refuse without odor. (See Sanitary Record, Nov., 1889.)

A full and excellent account of all foregoing methods is also given in the sixth report of the Provisional Board of Ontario, 1887, pp. 14-26.

The city of Montreal, population 70,000, has a destructor or incinerator which has been in operation since July, 1885, and has given as the report of the medical officer says, complete satisfaction. It is known as the Mann Furnace or Incinerator. From July to December the amount of night soil removed and burned was 1184 loads of 60 cubic feet each. The night soil is removed by odorless apparatus. The furnace being in blast, the contents of the barrels is emptied into the two funnels. The matter in its fall comes on a grating where it is quickly dried, and passing through falls on arches where the reduction is completed. Refuse is dumped directly from the wagons. One of the furnaces in use easily consumes from 50 to 70 cubic yards per day of 12 hours. The cost is from \$3,000 to \$6,000 per furnace. One of this kind has since been built at Chicago by Mr. Mann, of Montreal, the inventor.

"Its length is 69 feet, width 18 feet 8 inches, height, 21 feet. Large doors at the top receive the garbage; smaller doors beneath are for the distribution of the burning garbage by men with rakes and bars. The lower doors open into a box where the ashes of the burned garbage fall." In some respects this furnace is said not to have worked satisfactorily, but from the evidence furnished us by Dr. Laberge, the health officer in Montreal, (see Transactions of A. P. A. Association, Vol. XII) and from other sources, we believe the defects not to be due to the principle of the furnace but to some errors in construction and management, perhaps, also, to the pressure brought in favor of a rival furnace.

The chief other destructors that have come into especial notice in the United States, are as follows:

The Engle Furnace, of the Engle Sanitary and Cremation Company. Office, Des Moines, Iowa.

The Rider Garbage Furnace, Pittsburg, Pa.

The Vivartas Furnace of the Cremating and Refuse Company, Seymour & Smith, secretary, Plainfield, N. J.

The Vienna or Merz process, represented by "The Universal Extractor and Construction Company," Buffalo, N. Y. In this, the grease is removed by means of benzine, and the residue used as a fertilizer. Heat is used to remove moisture and to dry rather than to destroy. There are specimens of the Engle furnace in use in Minneapolis, Des Moines, Milwaukee and at Coney Island; and in New York, at the foot of East 16th street; of the Rider, at Pittsburgh; of the Merz, at Buffalo and Chicago.

Most of these deal with garbage, street sweepings, night soil, cesspool material, etc.

The old Dr. Marden furnace at Milwaukee, has been substituted by the Engel.

The various improvements on the Sieman's system of cremation, or the modification made by the Garini and Venini patterns of crematories have been utilized, while modes of caring for dust and for odorous gases have greatly improved. The device of Mr. Charles Jones, C. E., known as the Fume Cremator and attached to the furnace, seems equal to the prevention of all noxious vapors. See his small pamphlet on "Vapor Destructors," as published by the Association of Municipal and Sanitary Engineers and Surveyors, (England) 1887.

As to the cost of these destructors it varies with locality and the number of "cells" but they have been shown to be fully within the reach of most municipalities. Many companies will furnish upon a royalty and erect the works. The following is from an article by Dr. Kilmington.

"Among the questions likely to be asked under this topic, is that which relates to the primary cost of construction. Definite answers to this query cannot be given, for the reason that, with any of the furnaces we have described, cost must depend very largely upon location, availability of materials, command of skilled labor, and the size and capacity of the furnace which the circumstances and extent of the population demand. Equally important is the question of the cost of operation. This again is insusceptible of a definite reply. Location, available fuel-supply, econom-

ical management of the furnace fires, the class of garbage or refuse to be burned, and the proper disposition of fuel-forming materials—these are all considerations which largely affect the questions of working cost. The Mann furnace in Montreal is said to be operated at a cost of 25 cents per ton for miscellaneous refuse and of 75 cents per ton of night soil. It is claimed that the Rider furnace will do about the same thing.

OPERATING EXPENSES.

An estimate of the expenses of operating the Engle crematory in Minneapolis for a period of five days, during which the furnace was worked by three men entirely new to the task, two of whom were on duty by day and one by night, gives the following facts and figures :

CONSUMED IN FIVE DAYS.

Thirty-three horses, 59 dogs, 103 barrels of hotel and commission-house refuse, 12 loads of market offal, 70 loads manure, weighing in all over 200 tons.

Total cost of labor and fuel for this period \$38.25 or \$7.65 per day, the entire weight of refuse being destroyed at a cost of 19 cents per ton. The ash deposited in the course of the consumption of this material is exceedingly small in quantity, weighing less than 200 pounds per day.

This estimate, eminently satisfactory as it is, is not altogether a fair one. The men employed were wholly inexperienced. The furnace at the beginning of these five days was cold, and it required several hours to superheat it. The fuel used was simply lath edgings and coal screenings, or "breeze." The glut of horses was unusual and crowded out the ordinary supply of garbage. It is safe to say that upon an average run, over an extended period, 15 to 20 cents per ton of refuse would pay for the labor employed and the fuel consumed.

No doubt other improvements and reduction of expense will follow, but the time has already come when most of our cities of over 20,000 population should be inquiring into their needs for some such apparatus. Among the chief duties of City Boards of Health is the removal or destruction of all decayable putrescible material that remains from the necessities of civilized life. Locality and quantity will determine whether it can have carriage to the country, but if not, or if the expense is too great the ordeal of fire must deliver the people from the danger. We cannot too

strongly urge upon our cities that all such material is the enemy of health and so of property, and that cities as they grow in size must grow in enforced cleanliness. We shall be glad to aid any local board with further facts, or to give them facilities for fuller details as to the various forms of filth destructors and their results in actual operation.

The following from the *Metal Worker*, is a description of the disposal of garbage in London :

Somehow or other the rubbish both from the streets and the houses finds its way to the wharf. A considerable pile it makes. The 70 vans make on an average $3\frac{1}{2}$ loads of about 2 yards each a day, and the year's total shows about 38,000 loads taken from premises and 27,000 loads of sweepings from the streets. Averaging, then, 65,000 loads at a ton apiece, we have 65,000 tons of rubbish from within the city boundaries to be dealt with in a year. How is it disposed of? Let us go to the wharf and see. The chief object is the destructor—a furnace, or rather a set of furnaces—in which the rubbish is cremated after everything worth picking out has been removed. It is a range of very dirty boiler fires, which are fed with fuel from the front and with rubbish from the top. The “cells” are back to back, over a dust-chamber 10 feet 4 inches wide and 6 feet high, the flue from which leads to a 30 horse power boiler and to a chimney shaft of 150 feet. Night and day the fire is kept up, from Sunday midnight to Saturday at half-past eight in the evening. During the year over 19,000 loads of refuse are shot into it, and these produce a residuum of some 4,000 loads of ashes and cinders, more or less hard, not only valueless, but for the removal of which money has to be paid. The men work the destructor in three shifts of eight hours, there being three men on the top to feed the furnaces and three below firing and removing the clinkers and ashes.

We mount to the top of the furnaces with the superintendent, and stepping gingerly behind him on a very warm layer of odds and ends and carefully avoiding sundry small sloping gullies leading down to the fires, we stand in safety on an iron platform. Overhead runs a traveling crane, behind us is the engine house, in front of us is the space on which men loaded with big baskets are throwing down, one after another in constant succession, almost every variety of dry unsaleable refuse. As the heaps fall they are attacked by the three men with long pokers or peels and pushed down the sloping gullies into the fire. They are dealing with the refuse in retail ; we are to see it treated in wholesale. A van drives into our right and takes up its position under the crane. Its contents are known—nothing worth troubling about in that lot. The claws of the crane sink threateningly on to it. There is a loosening of bolts

and springs in the body of the van. Down go the crane claws and clutch hold of it. The chains tighten. Slowly and resistlessly the body of the van is lifted up from the frame work and hung in the air. Higher, higher it comes, until it is above our heads. Then the vertical movement becomes a horizontal one. Slowly along the double rails the crane and its burden travel toward the gullies of the fire. It stops. There is a clanking of chains, a rattle, a jingle, and a roar, and the stuff is shot in an avalanche before the men and rammed out of sight to pass through the furnace. The empty van body slips back to its level, glides horizontally to the rail end, sinks on to the frame work, with a slide and a click the whole thing is a dust cart again, and away it drives for another load to bring to destruction in the same way.

Every morning there comes a van from a hospital into whose contents no man pries. It is brought under the crane and lifted aloft and run over the fire, but its doors fall open only as it touches the gully, and no one sees what it has brought to be destroyed. Often a less horrible cartload comes with diseased meat or other condemned food to be lifted by the crane and similarly converted into ashes or clinkers. The dividing of the body of the van from the frame work has many advantages. There is no advantage in any excessive stock of wheels. The frames do double duty. The van bodies are replaceable by water tanks. Slide off the body and slip on the tank, and there is a water cart complete—a capital arrangement, for when there is most need of dust vans there is no need for water carts. The load we have seen dealt with was one of hopeless rubbish. Let us inquire into the fate of a more mixed accumulation now entering the yard. Along the yard side is a row of heaps over each of which a gang of pickers are busy. In one place the center heap has disappeared, sorted out into smaller heaps or carried off to the destructor opposite. The van is backed into the vacant space and the contents deposited on the ground. A gang sets to work on it, consisting of three women and a man, for the women, though surely disappearing, have not yet died out even in the City Yard.

The "leading woman" is in charge; next to her is the man who is known as "the filler." The woman works by contract at so much a load, and the members of the gang earn from 12 shillings to 17 shillings a week apiece. The fuel is here their perquisite. They sort out the paper, the string, the bones, the tins, the oyster shells, and, speaking generally, their performances are more curious than pleasant, and one is not very sorrowful to hear that the profit on what they do is so near extinction that in a few years their trade will be unknown. Women smoking short pipes and wearing straw-board gaiters and torn bonnet boxes for pinatores are perhaps worth seeing by students of so-called "life," but the fewer we have of them the better. A strange notion this of hereditary pickers;

mother to daughter, mother to daughter, going on the heap generation after generation—a caste or class by themselves, a profession, indeed, quite exclusive and a special inheritance of the spindle side. The paper and pasteboard, bundled up into trusses about as large as a bolting of straw, are loaded into barges and sent to Germany to be made into such paper as no English manufacturer can make a profit out of. The string goes to the mat makers, the tins and cans and old buckets and rusty saucepans are taken—when some one can be beguiled into taking them—to be melted down for the sake of the solder, which is the most valuable thing they have about them. The oyster shells go to the three mortar mills worked from the destructor's boiler and are ground up into manure.

A report of a committee (of which Dr S. S. Kilvington, of Minneapolis was Chairman), made to the last meeting of the A. P. H. Association, gives many interesting details. At present, we think the Engle furnace has been introduced more than any other. The Engle fire closet, for consuming the refuse of private dwellings, hotels, etc., is also worthy of examination. While, as yet, not able to speak with entire confidence as to the preference to be given both, the great variation in their efficiency and the varying push and energy of the various companies, should put municipalities on their guard against preferences based either on ex-parte or interested testimony or upon the sole opinions of a visiting committee. It is safer to take the testimony of Boards of Health, which has given some system a thorough trial, and of those who are experts in this particular service. We feel sure, however, that our larger cities should not delay the thorough examination of this mode of dealing with all garbage and refuse.

PHYSICAL CULTURE IN ITS HYGIENIC RELATIONS.

BY J. M. GREEN,

Principal of State Normal School.

In announcing this topic, the question most likely to present itself first is, What of Physical Culture is not related to Hygiene?

There is a physical culture which aims simply at grace of movement and facility of physical expression, as in gesture. While it must be admitted that this kind of culture cannot be claimed for hygiene, yet even it must aid hygiene by turning attention to the importance of the consideration of the body as a factor in educational promotion. While it is not within the province of this theme to discuss the æsthetical side of physical culture, we would not have it thought that in leaving it that it is not important. All that in expression of thought can be claimed for the eye, the mouth, or the more general features, can be claimed more emphatically for the system as a whole. The motion of the hand, the shrug of the shoulder, the toss of the head, responsive to the impulse of the mind, have relationship to the body.

Then too the grace in movement may not be considered beneath our consideration. We of this nineteenth century are less complimentary to ourselves than were the citizens of Athens five hundred years before the Christian era. First attention was given to the cultivation of the human form. We are not so likely to give attention to the human form as to that of lower orders of animals. How great the importance attached to the gait or movement of a horse. What care and attention it receives that it may be developed not only in speed but grace. Our geographies note that such and such

counties and States are noted for their fine stock. Which of our counties and States are noted for their fine men? Is not grace in movement and symmetry in development as worthy of encouragement in men as in brute? Is not the human soul worthy a cultured tenement?

The fact that men will follow their ideals is abundantly demonstrated by history and observation. The Platonic or Stoic ideal was deeply impressed upon the educational conception of the human race.

Physical culture may be defined as such a symmetrical development of the various physical functions of the body as will enable the body, as a unit, to accomplish the best results possible to it.

If you will persist in having school teachers in your Sanitary Association, you must bear with us if we reason somewhat from an educational basis. Placing the soul as the central figure of all our systems, I prefer to view the physical first from the standpoint of the mental, that the former may always be considered secondary to the latter. If we may wait upon the physiological without detriment to the psychological, then we may turn to the task with unrestrained zeal.

Physiologists tell us that the brain is the centre of the nervous system, as it is also the organ of which mind is a function. As the centre of the nervous system it possesses its avenues of connection and communication with all parts of the body.

It is not questioned that the brain is developed by the development of certain of these avenues of connection or communication, the sensory nerves. If this point is admitted, may it not be admitted with equal safety that the symmetrical development of the brain depends upon the symmetrical use or development of these various sensory nerves or avenues of communication?

Admitting this point to be true, we next turn to mind as a function of the brain. While we do not admit that mind is in any any sense a part of brain, we do claim that it is a function of brain. Where there is no brain there is no mind. Now if mind is a function of brain its strength is in proportion to the development of that brain.

Put a tiny blood-clot on that brain and what becomes of the action of mind; may it not be claimed, with equal probability of correctness, that for a tiny contraction or lack of proportionate

development of that brain, there is a corresponding lack of development in mental power. If these points may be admitted, the conclusion necessarily follows that the symmetrically developed mind depends upon the symmetrically developed brain, and the symmetrically developed brain depends upon the symmetrically developed body.

While we admit that the above line of argument is not conclusively proven to be correct, and is based somewhat upon inference, we unhesitatingly claim that the man who undertakes to prove it to be false, has more of a task before him than the man who undertakes to prove it to be true.

The above are our grounds for feeling that we have the educational sanction for the culture of the physical, but while these arguments are the more important in proportion as the mind is more important than the body, they are not the most direct.

The most direct arguments for physical culture are from the hygienic stand point. Be it understood that this claim for this culture is not only general but is for special attention to it in the schools. It has been claimed that men are governed by their idols. That either this government, or ignorance of it, results in the neglect of important parts of the physical organization is apparent to the most casual observer. It is then the duty of the schools both to give light and set the new ideal. Let us glance at some of the results of this neglect.

We first notice it in the different development of the different races of men. Compare the Mongolian, the African, the Indian and the Caucasian, and note the varying physiological development.

How long has the sentimentalist pictured to us the sturdy flat-footed warrior of the West, but the investigations of the Indian bureau disclose quite another condition of things. This Bureau discloses that almost all this race are tainted with the diseases and weakness that are the resultants of the neglect of some portion of the system.

We may next notice these results in the different class of men as to occupation. Note the light and graceful movement of the dancing master, the feeble walk of the cobbler, the stooped shoulders and swaggering step of the miner, the long and heavy step and rounded shoulders of the farmer and cart-driver, the pale and slender form of the student, the slight and tapering form of the lady

devotee of fashion, and the better development of the lady devotee of comfort, beauty and judgment.

Of course, all these different degrees of development under the different occupations but demonstrate the result of sacrificing one physical function to the upbuilding of another. Now, it can be shown with equal force, that these peculiar neglects are attended by these special diseases. For the proofs it is but fair to call upon those present, learned in the medical profession.

A distinguished physician told me not long since that a very large proportion of the lung diseases developed in the apex of the lungs, and that the proportion was larger among ladies than gentlemen, and among clerks, book-keepers and other persons of sedentary habits, than among mechanics and persons of active pursuits. The reason he gave was that persons fell into the habit of stooping the shoulders and bearing the arms by the sides, and allowed the shoulder blades to rest upon the apex of the lungs, and did not lift them to afford a full inflation of the lungs and that a portion of the lungs lying dormant invited disease in response to nature's law of disposing of that which is not of use to her. A distinguished clergyman and orator told me that for some years he felt a weakness, but that he had thrown off the disposition to the disease and made of himself a strong and healthy man by simply practicing fully inflating the lungs and throwing the shoulders back a number of times each day.

It would not be difficult to instance diseases that are the direct result of improper regard for the digestive organs.

The evil results of a want of proper care for the physical organism is seen no where more than among students. The athlete in the great physical contests of the college sacrifices the nutriment that should go to the brain to the building up of muscle. The competitor for the intellectual prize sacrifices the exercise and nutriment necessary to the healthy action of the body, and even the nourishment of the brain itself that he may dwell on his books.

Many bright students graduate with diplomas that should only admit them to the hospitals.

Now neglect has its opposite care. Wherever a disease is the result of neglect, its prevention is possible by care or physical culture and intelligence.

How shall this knowledge or culture be disseminated? Not

alone by physicians. A distinguished physician said that he feared too many physicians felt that their prosperity depended upon their taking the opposite course. How, then, shall this intelligence be spread? The answer is by the common means, through the press and the schools, and by enlisting all the common agencies at hand. Perhaps no single one of these agencies is more powerful than the schools. Here the pupils are not simply within the reach of the knowledge on these points, but may be held to the practice.

How best shall we proceed to accomplish these ends?

I answer, first begin at the sources of preparation for teachers.

Over 400 persons in the State are directly preparing to teach. I would have in connection with every Normal or training school a gymnasium fitted up with such apparatus as is best adapted to the development of each of the various physical organs. I would have a teacher of such a class who is qualified to examine the student and prescribe the kind of exercise needed, and then watch and guard the student under such exercise to see to it that the very exercise was not abused. Such instruction as this has been abundantly tried to testify to its value. Measurements of the chest have been taken, both before and after the course of exercises, and the development accompanied by increased health and vigor noted. Locate such a department as this at our State Normal School, and the results upon the schools of the State cannot be foretold. The question will at once arise, what will the teachers do in schools where no apparatus is provided? I answer, that what is most needed is intelligence, accompanied by a desire for physical culture. The means will then certainly be provided, though in varying degrees. While a gymnasium may not be at hand, almost any school can provide means for lifting the arms and taking a long breath.

In almost any school where pupils are sacrificing the eyes and irritating the nervous system by facing the light they may be permitted to turn around and face the other way. There is rarely a school that may not have in one corner of the room a swinging pole upon which the pupils may be permitted to try their strength in raising themselves from the floor. A broom handle will serve for a gripping machine. Many of the best results have been secured without the aid of equipped gymnasiums or apparatus, if only the intelligence and desire was possessed. I would have well equipped departments at the sources of information, and send forth trained

persons with a desire to disseminate this valuable information and rely upon their ingenuity to provide in this as in many other branches the means. There are many other resources for the dissemination of information in this line, such as teachers' conventions, associations, institutes, press clubs, etc., all of which can and should be reached.

When *Æneas* in his famous journey from Troy to Italy visited Dido she conducted him to an eminence where he might look down upon the new Carthage and witness the busy scene of building houses, marking out places for new foundations, laying out streets, improving gardens, etc.

These are the occupations that have engaged our attention in this new country, but to the neglect of the bodies that were to reap the rewards of these labors.

Now that our work has progressed to a goodly degree, let us broaden our educational conceptions and practices to the promotion of this most important branch of training and education, physical culture.

THE NEEDS OF MEDICAL OFFICERS FOR SCHOOL DISTRICTS.

BY G. F. WILBUR, M. D., OF ASBURY PARK.

It will not be denied that the object of the training of children at school is the symmetrical development of *all* the faculties, physical as well as mental. In no other way can the real object of our Public School system—the attainment of an ideal citizenship—be accomplished. In order to bring about this great result the highest possible condition of physical health is indispensable. This can only be attained through a faithful observance of the laws of health. This must be mainly effected through a proper regulation of the occupations and opportunities that are afforded where so large a portion of the time is *spent* as at the school. The improvements and discoveries of sanitary science have come to cover so vast a field that the teachers themselves, however faithful and competent, cannot be expected to be very fully conversant with even their outlines. Trustees, of course, are in no better condition; and the higher school authorities are more than occupied with their arduous and exacting duties in other departments than those relating to health.

The hygienic supervision of the schools of a city is amply sufficient to furnish abundant work for the more industrious sanitarian to be found within it. The simple mention of the many subjects that would naturally come within the scope of his jurisdiction would, to one already occupied, be quite discouraging. It would be said that sufficient instruction on these points may be given in printed form for the hygienic management of schools. But conditions vary, and suggestions suitable for one locality may be quite

inappropriate for another. The examination of school grounds with reference to a proper sewerage and freedom from cesspools could not be conducted with too much particularity and strictness. The liability of pools and puddles to burrow for themselves communications with adjacent wells is no longer a matter of dispute. The escape of the contents of a barrel of petroleum that had been buried on the side of a hill was, not long ago, found to have tainted the water of a circuit of wells nine hundred feet distant, and to have so changed the taste that fifteen families were deprived of the use of it for many days. Had this soakage been sewage instead of petroleum, who can doubt that the result might have been wholesale water poisoning and a harvest of typhoid fever?

Another subject of the greatest importance, needing expert supervision, is the arrangement of light for particular rooms. Indeed, the scientific examination of the eyes of pupils, with the view of adapting the surroundings and arrangements for the admission of the proper amount and the direction of light forms in European schools a prominent subject for supervision. In truth, there is no good reason why this very regulation may not be adopted with advantage here. It is well known that many cases of near-sightedness are produced in children by studying in rooms poorly lighted, and that the fine prints of many text-books increase the evil. It is not too much to say that all such books, no matter how great their merit in other respects, should be at once banished from the school-room. Even where near-sightedness is not produced, the effort to see what is half invisible often produces, in children, an incurable squint. We all know that the lens and adjacent tissues of the eyes in children are exceedingly elastic, and that causes that would not operate at all on older persons are to them highly injurious. It is not proposed here to inquire into the exact way in which these changes are produced. It makes no difference in this connection, whether they are brought about by a slow congestion, causing the tissues of the eye-ball to become weakened, and so liable to give way posteriorly, which is supposed to be the least vulnerable direction, and so become elongated; or, whether the mere pressure of the muscles on the sides of the eye-ball, in straining to read fine print causes it to give way in the direction mentioned, and so cause a gradual lengthening of the axis of the eye backward.

We know that this great affliction is brought on by studying under wrong conditions in childhood. In bad cases of this kind, the retina itself, not being able to follow the other tissues of the eye in their extension backward, becomes separated from them, causing partial blindness. Hence the unspeakable importance of watching over and protecting the children. The same exposure later in life might do no particular harm. We constantly see artisans, whose business requires constant looking at minute objects, retaining their sight unimpaired all their lives. The real reason that makes a constant supervision indispensable is the fact that these changes in the vision of the child come on so insidiously that the most intelligent of our teachers might not notice anything wrong until the mischief is beyond repair; the eyes of the child even looking brighter while sustaining the injury. A good general direction to give might be to recommend to teachers to suggest a frequent resting of the eyes by looking away from the book to distant objects.

We take it for granted that the time is past when teachers box the ears of the scholars for looking off the book. Another very important object to be accomplished through the kind of oversight we are insisting upon, is the thorough personal comfort of the children, as to position, proper support of the limbs, etc. Curvature of the spine is doubtless frequently brought on by scholars bending, year after year, over desks that are too low. The shame and pains of seeing little children perched on high benches with their feet dangling in the air, is now I trust, happily a thing of the past. Still far too many discomforts but little short of this enormity remain. The best results of school work can only be seen, or expected to be seen, where every possible attention is paid to physical comfort. Whenever a child appears tired, sluggish, inattentive, the imprisonment of the school-room is no place for him. The inexperienced teacher says he is lazy, that he needs discipline. The medical examiner says that he is sick, and needs air and exercise.

Another source not only of discomfort, but of the greatest danger is the dampness of many school buildings. Many of the country school houses in some of the counties should be condemned on purely hygienic grounds. The floors are damp, the buildings are on low grounds, the earth beneath the buildings is water-soaked. The children are exposed to rheumatism and diphtheria. Their

feet are wet and they are in danger of consumption. Is there not great need of medical inspection here? And yet we must go slow or we shall encounter a prejudice that will retard matters rather than advance them. No school building should be allowed to be built on ground that has not been pronounced suitable by competent authority.

The question of the retention in the school of sickly children and the period of time when the children shall return to the school, after having suffered from contagious diseases—their period of quarantining so to speak—can, of course, only be decided by intelligent authority, such as we are here insisting upon. Nor is the amount and character of the study to be undertaken by little children, a less legitimate province for the judgment of the Hygienic instructor. Approving words for a moderate ambition, in a child are all very well, but what shall be said of the hot-house stimulation and cramming that characterize some city schools? The multitude of studies, the far too short intermissions, the struggles for prizes and promotions, the high pressure and tension everywhere, are fraught with fearful dangers. I do not wish to be understood as blaming the teachers for all this. They are urged on to this over-pressure by foolish and ambitious parents. The teachers themselves need protection from overwork as well as the children. If our teachers could be allowed to have their way, the dangers we have described would be much diminished. It is for them as well as for the children, that the authority that we are contending for should be instituted.

The studies of a little child should never be a task. They should never be presented to him in the shape of a task. They should be a pleasure to him, or they should for the time being be discontinued. This should be a partial test, at least, of their fitness. When the child grows older a new test may be provided. Whenever a child shows persistent and continuous aversion to studies that are presented in an attractive and comprehensive manner by a competent teacher, we may well begin to look for some hidden underlying cause for such aversion in defective eyes, perhaps, or in some other and more serious pathological condition or process that may be going on in the child's body. It is plain that there is here a wide and exceedingly important field for expert medical investigation. Teachers could not be expected to be the proper judges in these

cases. Many a child has been sent to a premature grave by neglect at that period of life which deserves and should receive the most careful watchfulness. These necessities cannot be met except by direct and constant medical supervision of schools, and when the solemn importance of the matter is considered the marvel is that such offices do not now exist in every county, not only of this State but of every State in the Union. In some European cities, notably the city of Brussels, the most scrupulous care is taken of children in schools by medical men appointed for the purpose, and whose time is solely devoted to this one object. This care is exercised over the most minute details of the student's life, including periodic examinations of each child's eyes, and of special organs as well as of the general health. The time must come when we shall do as well in this country as they do abroad. The State stands to the child *in loco parentis*, and it is the manifest duty of the State to throw around the child every safeguard to the child's health in its power.

The great subjects of heating and ventilation, as well as the directing and regulations of the exercise of students are of profound importance and can never be scientifically regulated except through the advice and supervision of competent medical authority. But I have refrained from dilating much upon these subjects, not only for the reason that each one of them embraces far too wide a field to be treated in a single paper with any degree of satisfaction, but also on account of the fact that they are so frequently touched upon by others. I deem our State most fortunate in having at the head of its Department of Instruction a gentleman whose zeal for education is only equalled by his interest in the health of the people; whose belief it is that the schools of the State are not meant to produce prodigies but citizens, and that whatever tends to promote this end is sure to be right. And so it must ever be. For after the school days are over and the scholars come to take their place in the ranks of the world's workers, the question that will be asked of them will be not so much, "What do you know?" as "What can you do;" but how well can you do it and how will your health hold out while you are doing it?

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THE IMPROVEMENT OF SANITARY CONDITIONS IN THE HEALTH AND PLEASURE RESORTS OF NEW JERSEY.

BY HENRY MITCHELL, M. D.,
State Sanitary Inspector.

Towns and districts to which large numbers of transient residents are drawn in search of health and pleasure, have, in addition to the motives common to other communities, extraordinary commercial incentives to create and maintain good sanitary conditions.

Such resorts are dependent for prosperity upon their fame for salubrity and healthfulness, as manufacturing centres are dependent upon abundant labor and favoring transportation facilities, or as agricultural districts depend upon fertility of soil and easy access to markets.

Hygiene should be a part of their stock in trade—their “anchor to windward”—and, viewed merely from a business standpoint, health protection should there be studied and practiced with surpassing diligence.

It is not only the immediate vicinity in which these resorts are situated, which is financially concerned in the judicious employment there, of efforts to banish all causes of preventable disease, but the whole State participates in the profit or loss which attends the summer resort business, for its development in New Jersey has reached proportions which compare favorably in financial importance with the great industries of the Commonwealth.

We are thus led to the expectation that both individual and organized endeavor to promote health should be exceedingly energetic in these places, and that a widespread public interest should exist in their sanitary administration.

Local option in all matters relating to sanitation has been carefully provided by the legislature, and if the people of any district so will, they may dwell in squalor and die off in throngs. While to local boards is given ample power to protect the public health if they choose to, or if their constituents demand the execution of the laws, yet no authority exists outside of any health district to act for the local board in promoting health interests.

The members of this association are painfully conscious that the eminently successful efforts to provide adequate legislation to enable these, together with other communities throughout the State, to suppress unhealthful influences, have not yet been sufficiently appreciated by those persons whose business interests are most seriously damaged by uncleanness, and you are aware that much remains to be done in some resorts before they will become the examples of sanitary perfection which they should be.

Indeed there are a number of these districts in the State, in which the local health authorities, and the property owners whom they represent, are pathetic concerning all subjects relating to health protection.

It is false pretense and fraud for municipalities which have no other business interests than those attending the entertainment of transient guests, to permit indiscriminate pollution of soil, water, and air; to ignore the relation of cesspools and drains to wells; to heedlessly store up typhoid poison in vaults and pits whence it may enter the soil and finally be pumped from wells to reproduce fatal effects; to passively disregard the spread of communicable diseases; to permit sewer air to have free access to dwellings, and to perform a hundred other crimes of omission against material laws affecting health. For the patrons from whom the annual revenue is derived presuppose, and there is an implied contract that artificial influences in health resorts will be kept healthful.

This association is the volunteer guardian of the State hygienic interests. Will it permit, without protest, confiding visitors who enter within our boundaries in search of rest and recreation, to be housed in death traps and exposed to the risks attending the use of water from polluted wells? Is it not incumbent upon us to attempt to impress upon negligent managers of health and pleasure resorts a sense of their responsibility to the public? Where, instead of leading in devising and executing sanitary precautions,

these resorts are trusting to good fortune to tide them over mis-haps due to unhygienic conditions, and in their greed for fat bank accounts they are giving no heed to the danger to health consequent upon the soil and water pollution which their methods year after year create and augment, surely some monitor should touch their consciences or their pockets and guide them into better practices.

A large proportion of the hotels and boarding houses in many of these places were erected at a time when the outlook for prolonged patronage was problematical, and economy in the first outlay was a prevailing cautionary measure. Sanitary safety was scarcely given a passing thought. A well, a cesspool and a privy vault were hurriedly provided, and convenience was usually the only consideration in selecting the site for the location of these appendages to the house.

Silence and long suffering on the part of guests concerning offensive odors and tainted water have aided owners to cast aside troublesome doubts about the safety of their premises, and apparently warranted and sustained an indisposition to appropriate any portion of the income to rooting out and remodeling old drainage makeshafts or to supply better water. Past immunity from direct and calamitous results forms a powerful argument in favor of the presumption that no catastrophe will attend the future use of present devices.

But it is not only in houses and towns which have long been established that sanitation is ignored. One of the more recent of the many projected "sanitariums" has not yet a single inhabitant, but several very beautiful cottages have been erected there, and a hotel to cost one hundred thousand dollars is promised. Miles of streets have been graded and curbed, and much money has been expended in preparing the locality to become the site of a city. The buildings already constructed are plumbed and supplied with numerous drainage fixtures, but neither sewers nor a public water supply is announced, and cesspools and wells will probably be offered to the expected occupants of the handsome villas wherewith to commence the old operation of passing a fluid from a hole in the ground back into the soil so as to pollute all surroundings.

It may be confidently predicted that unless the projectors of this enterprise change their plans, New Jersey's death rate will be

increased when this locality shall be long enough inhabited.

The system recently inaugurated by the New York City Board of Health, of notification in cases of typhoid fever, informing local boards in rural districts whenever that tell-tale disease appears in persons who have returned to the city after having sojourned within their jurisdiction, should have a salutary influence, and the records of the New York health office, if they are correctly gathered, will in time help to indicate where it is unsafe to spend the summer.

What shall be the remedy for inactivity in health and pleasure resorts in promoting health and preventing disease?

1. Shall the State Board of Health ask Legislative authority to perform, under pressing circumstances, some of the duties of local boards?

2. Shall publication of local shortcomings be employed to arouse neglectful communities?

3. Shall the present system of local health administration be replaced by a different method?

4. Or shall improvement be awaited until an outbreak of disease in one or more of these resorts startles the country and compels attention to hygiene?

The first proposition involves the assumption of executive responsibility by the State Board of Health, and before advocating such a step for obtaining relief we should inquire into the equipment and facilities possessed by the State Board and learn whether they are prepared to deal with the detail of individual violation of laws and ordinances.

To publish reports of unhygienic conditions is an exceedingly severe mode of compelling improvement, but it would unquestionably prove to be wonderfully potent in the case of summer resorts.

To change the character of local health administration is probably premature. We may, however, expect radical alterations in the future in the system of official supervision over public health interests, for advances in hygieology, and the production of skilled practitioners of the art of hygiene, together with a growing public esteem for the beneficial results of sanitation will aid, extend and in time readjust the application of means for the promotion of health.

A conservative adoption of the first two of the foregoing propositions is apparently feasible.

In cases where a crying evil exists, threatening health and life, reproaching the whole State and bringing into contempt the public health supervision, the State board might interpose its good offices as heretofore, and if necessary it might even with its present meagre resources, prepare itself to invoke the power of the courts to secure improvement or abatement of objectionable conditions.

In other cases where the force of public opinion will effect improvement the publication of facts would prove an available motive by which to accomplish the removal of dangers to health.

In any endeavor to improve sanitary conditions in health and pleasure resorts which may be inaugurated by this Association or by the State Board of Health there will be hearty cooperation on the part of towns belonging to this class which have already taken the beams out of their own eyes. For the highest degree of prosperity for these places can only be reached when the whole group comes to be known as safe havens of retreat from preventable causes of disease.

So long as just reflections are cast upon any of these resorts because of their trifling with the health of visitors, so long will all of them suffer to some extent from a suspicion that if any are dangerous all may be.



Abstract From the Papers and Discussions of the New Jersey Sanitary Association.

Session of 1889.

BY D. C. ENGLISH, M. D., SECRETARY.

The fifteenth annual meeting of the New Jersey Sanitary Association was held in the new library room in the State House, Trenton, commencing Friday morning, November 22d, at eleven o'clock. In the temporary absence of the President, George P. Olcott, C. E., of Orange, occupied the chair. After a brief report by the Secretary Dr. H. G. Wetherill, of Trenton, Chairman of the Local Committee, in a short address, extended a welcome to the members to the city of Trenton, and spoke of the importance of the work of the association. Dr. A. C. Hunt called attention to the large number of reports from various boards of health and sanitary associations that had been placed on the tables by the State Board of Health, and which were at the disposal of the members present.

C. Philip Bassett, C. E., of Newark, was then introduced and read an interesting paper on "The East Orange sewage disposal works as compared with other methods." (See fuller account of this paper, page 73, of this report).

James Owen, C. E., of Montclair, was introduced to open the discussion of the paper. He congratulated Mr. Bassett on the success of the system which he believed answered the requirement of East Orange far better than any other system now in use. One thing he specially commended that these works were built by day's work, and so were well done. But it is not a perfect system; for instance,

of the one and a quarter million of gallons of the sewage which passes through these works each day, at least 600,000 gallons were ground water which should not be there. He did not believe in the use of earthen pipes; he would urge use of iron pipes only. As a matter of abstract principle he believed the Sewage Disposal Works should not exist. Sewage should be utilized as far as possible, and a main sewer built from East Orange to the Passaic river.

Dr. E. M. Hunt, Secretary of the State Board of Health, said that being somewhat familiar with the excellent work of Engineer Bassett he desired to submit these propositions:

1. The progress of knowledge as to sewerage methods in the last ten years have not shown anything equal to Intermittent Downward Filtration through suitable land. But for various reasons of locality and expense it cannot be always employed and is not necessary to satisfactory clarification.

2. Locality and circumstances must largely determine the choice of methods, of which subsidence by short detention in tanks and by mechanical and chemical methods are among the most practicable. Each year presents new methods, some of which have great merit.

3. We need constantly to be looking into these as also for improvements in mechanical devices for hastening clarification and for dealing with sludge. We point as specimens in our State to some of those of Engineer Bassett and to the modification of flush method devised by Prof. McMillan at Morris Plains.

4. One of the great advantages of the mechanical and chemical system is that it requires the use of much less land for purposes of filtration.

5. It is now certain that there are methods in the hands of our Sanitary Engineers sufficiently cheap and successful to leave no excuse for sewage in cities and villages stored in cesspools or polluting the surface of the ground. With these and with the new methods of garbage disposal by cremation it is not the fault of sanitarians if the people of municipalities continue to attempt to live and thrive amid forced and foul organic decompositions. Nor should our smaller cities and towns await greater growth by which comprehensive and efficient plans will be made more difficult of execution.

Mr. J. C. Pumpelly, of Morristown, and Dr. A. C. Hunt, of

Metuchen, also spoke in commendation of the paper and of the work done in East Orange.

AFTERNOON SESSION.

Called to order by President, Dowling Benjamin, M. D., of Camden. George W. Howell, C. E., of Morristown, was introduced and presented a paper on the "Passaic River Drainage," substantially as follows: Lying within thirty miles of New York city is a tract of country over twenty miles long and varying from two to four miles in width, which, during every time of flood, is submerged by freshets continuing from one to three weeks, and sometimes the whole season, thus causing a loss in crops often to the amount of \$75,000 to \$100,000 in a single year. This scope of flat land outlines the bottom of an old geologic lake which spread over all the country from Liberty Corner on the south to Wynockie on the north, a distance of forty miles, and from the foot hills of the Highland range on the west, to the great trap dike known as the "Watchung or Orange Mountains" on the east, about 10 miles at the widest. This immense lake of glacial water was held in place by ice and drift. Extending across the valley about where the D. L. and W. Railroad crosses the Passaic River between Little Falls and Paterson. Its surface was about 375 feet above tide. The enclosing moraine was washed away and the surface was lowered some 200 feet until its further subsidence was stopped by a trap ridge running across the valley at Little Falls, where the river now descends about thirty feet. The depression behind this reef has been gradually filled up by the wash from the surrounding slopes, producing this large tract of almost level country covered with a rich, deep alluvium of great agricultural value, except for the frequent flooding of the entire tract.

Engineer Howell then calls attention in the paper to the efforts which have been made from the earliest settlement of the country to reclaim these lands, how the statute books of New Jersey show many laws passed in relation thereto, from long before the Revolution down to the present day. But owing to the magnitude of the work involved and the poverty of the land owners, no practical results were effected. He refers to some of the efforts made by the building of reefs and dams, and then states that as early as 1855

the annual reports of the State Geological Survey referred to the great benefit to be derived from reclaiming these lands, not only as a means of largely increasing the agricultural resources of the valley, but also for the improved sanitary conditions to be secured to this locality and to the surrounding slopes, this whole region being notoriously subject to malarial influences.

In 1867 Prof. G. H. Cook, our late State Geologist, then but recently appointed, began systematically to work in the interest of these and other drowned lands of the State, and from that year to the present time not a report was issued that did not contain reference to this important matter. Through the careful study and persistent efforts of Prof. Cook a general Drainage Law was passed in 1871, taking the place of all the partial and ineffective laws previously passed. This law provides that on application of a certain number of land owners to the board of managers of the State Geological Survey the latter are authorized to examine any tract of land subject to overflow, to devise some plan for reclaiming the same, and to recommend said plan for the approval of the Supreme Court. If approved the court appoints commissioners to carry out the scheme as presented by the board of managers. These commissioners are given power to assess and collect the expenses of such work from the lands benefitted. In pursuance of this Act three commissioners were appointed early in 1873, one of whom is still connected with the commission.

From surveys made it was found that the river at Little Falls drains an area of 833 square miles, and in the course of 22 miles through this tract there is a fall of only six and three-tenths feet, or about three and one-half inches per mile, too little by far to carry readily the high-water flow, amounting at times to 7,000 cubic feet per second at the dam; and that an area of over 13,000 acres is liable to overflow. The plan, as then devised, provided for a fall of about $7\frac{1}{2}$ inches per mile throughout the whole distance. This was to be effected chiefly by reducing the new stone dam at Little Falls seven feet, blasting out the rock-reef above the dam to the width of 200 feet, and removing a bank of earth and boulders at Two Bridges. With these, and some minor obstructions removed, it was expected that the scouring action of the river itself, induced by the increased velocity, would virtually complete the work.

Mr. Howell then refers to the financial depression of 1873, which

made it impossible to raise sufficient funds to make a beginning, and it was not till 1886 that the scheme was revived and two new commissioners, to fill vacancies, were appointed. Their first duty was to estimate the cost of the improvement with a view of placing upon the market a sufficient amount of bonds in anticipation of assessments. Then the question arose as to damages to the Beatty Manufacturing Company, at Little Falls, whose water power and extensive improvements were of very great value, the commissioners having under the law the power of condemnation. The amount of award was finally fixed at \$55,000. While an appeal by the Company was pending, the Commissioners, after consulting with eminent hydraulic engineers, recommended to the Board of Managers a modification of the original plan, which was adopted and authorized by the Supreme Court. The principal change is at the dam. This is to be reduced 20 inches in height instead of seven feet, and gates are to be erected which will carry a body of water 25 feet wide and 16 feet deep. These gates are to be opened at the beginning of a rise of water, and kept open until the river returns to its normal condition. The expense of reducing the dam, and of constructing and operating the gates is to be borne by the Beatty Manufacturing Company, under a contract already made with them. No award of damages is to be paid to them. In addition, the Commissioners are to execute a channel 25 feet wide and 16 feet deep, to draw from the bed of the river above the reef, carrying this channel down through the dam into the stream below, and obstructions in the bed of the river below are to be removed by them to insure a rapid flow of the water from the gates to the main fall about 700 feet below. In fact, the main fall of about 20 feet will be obtained, and the bed of the river will be excavated on a regular grade from the gates to the foot of the fall below. The amount of work to be done is approximately,—

Twenty-two thousand yards trap rock excavation at Little Falls, 30,000 yards earth and boulders at Bwo Tridges, and 50,000 yards earth at Pine Brook. On Sep. 1, 1888, the Commissioners issued six per cent. bonds, interest payable semi-annually, to the amount of \$130,000, but will place upon the market only enough to carry the work through. On July 16, 1889, the Commissioners awarded the contract for the entire work to A. B. Nelson, of New Brunswick, over six competing bidders, at prices for rock varying from

\$1.87 to \$4.80 per yard, according to locality; for earth and boulders at 46 cents, and earth at 31 cents. These prices at estimated quantities make the cost of the whole about \$94,000. To this must be added expenses of surveys, supervision and assessments, and the interest on bonds. The contractor takes 45 per cent. of his pay in bonds at par. There have been sold at par for cash \$40,000, leaving to be disposed of, on a basis of \$100,000, only about \$15,000.

Mr. Howell then gives an account of the work done since August 1, 1889, with some details of the method, and considerable promising data concerning the efficiency of the plan now being followed. He closes his valuable paper as follows:

As the law now stands the expense of work is to be assessed wholly on the flowed lands. In many cases this must be burdensome, though we are happy to state that most of the people are anxious for the completion of the work. Great benefits will result to adjoining lands not included in the assessment, and the taxable property of the counties will be largely increased in value. In addition the increased healthfulness of the entire region cannot be estimated in dollars. * * * Reference has already been made to the important part taken by Prof. Cook in the inception and carrying out of this scheme, and I cannot bring this paper to a close without attempting to pay just tribute to his memory. His was the brain that devised the original plan, that formulated the law and got it passed. Through discouragements and obstacles that would have staggered any ordinary man, his indomitable courage and patience, and his cheery hopefulness carried him along, and after the persistent efforts and weary waiting of twenty-five years, he had the satisfaction of seeing the fruits of his solicitude in the actual beginning of the work under the most auspicious circumstances. Only two days before his death, he saw the first monthly payment made to the contractor, and he could not sufficiently express his gratification at the crowning of his life work. In this Association we shall miss his knowledge and counsel, and who shall take his place in the State on the many lines of public interest to which his unselfish life was devoted? As the years go by the grandeur of his character and work will be more and more appreciated, and through the unostentatious exterior he will be recognized as what he was—a great man.

The paper was then discussed by Civil Engineers Bassett and Owen, both of whom availed themselves of the opportunity given by the writer to question him as to the plans or the work already done, etc. Both spoke of the great importance of the work to the State and especially to the sections most affected by it.

The Secretary called attention to the appropriate reference in the paper to the late Prof. Cook, and said that by the Executive Council through their Chairman and Secretary had at the time of the death of Prof. Cook presented a letter of condolence to the family. The letter was read and after remarks by a number of the members present the communication was unanimously approved by the Association, and ordered entered in full upon the minutes.

The President then introduced Henry Mitchell, M. D., of Asbury Park, who read a paper on "The Improvement of Sanitary Conditions in the Health and Pleasure Resorts of New Jersey."

(See page 133, of this report for this paper.)

Mr. J. C. Pumpelly, of Morristown, spoke of the paper as one that for its ability as well as for the great importance of the subject on which it treats, should be given to the public. He spoke of the need of healthful surroundings at these places where so many thousands go for health and rest, and of the indifference of local health boards in many places he had visited in our State and on Long Island. Upon his motion the paper was referred to the Executive Council for their action.

The next paper was announced on "The Climate Treatment of Gastro-intestinal Diseases in Children." The writer, Boardman Reed, M. D., of Atlantic City, not being able to attend, his paper was read by the Secretary.

Climatic treatment can at present be carried out only by transporting the patient to some locality having a different climate. Why does a change of air often effect such striking remedial results? The question has never been satisfactorily answered. We can only infer that the breathing of different air acts as a stimulant to the vital processes. The probability is that there are ingredients peculiar to the atmosphere of every locality that have a tonic effect at first, while, like too long a course of quinine, they cease to stimulate. Then upon taking the patient to a different climate other tonic ingredients are inspired with at first invigorating and restorative effect, as before. Some such varying substances there must be

in the air of every region, whether they are gaseous elements unrecognized by the chemist, or only coarser material particles held in suspension, as certain amounts of saline constituents are known to be held in suspension in sea air.

Dr. Reed then referred to his experience in Atlantic City, where cholera infantum is rarely met with, and said, that no case of genuine acute cholera infantum has occurred in his practice for at least four years. It may be only a coincidence that for about the same period of time, the town has had an excellent water supply and a system of underground sewerage in full operation.

He urged that the best treatment of the graver forms of "summer complaint" is the preventive one, and the best method of prevention is to take teething infants away from the large cities before the hot season begins to the country, the mountains, or seashore, where the air is uncontaminated, the heat less intense, and the milk pure. When such preventive treatment has been neglected, and the child has been attacked, change to a more salubrious locality is still usually practicable. To the mountains or seashore is the most beneficial, the relative proximity or convenience of access often properly enough deciding the choice. No complicating conditions contra-indicate the seashore except advanced phthisis, while infants with organic heart disease or seriously enfeebled circulation should not take to very high altitudes.

The doctor then speaks of the advantage of a change of climate in cases of *Eutero-colitis*, believing it the most efficacious means of cure in attacks that have resisted treatment at home. When children wasted and debilitated to the last degree with diarrhoea are removed to a favorable locality by the sea, such as Atlantic City, concerning which he could speak definitely from a long personal experience, the result, he claimed, is usually a prompt and surprising improvement.

He believed that this may, and often does, result from the stimulating effects of the change of air alone, but more frequently such patients require skillful medical attention as well as the best of nursing, certainly for the first few days.

Dr. Reed then dwells upon some important points in the use of remedies, and of the importance of certain hygienic precautions, e. g., the flannel belly-band never to be left off, especially at the seashore; of rendering the food and drink as nearly aseptic as possible;

of boiling all water given to sick babies, whether as drink or mixed with their food; of boiling the milk as soon as obtained, and then preserved in cork bottles, etc.

The paper closed as follows:

In the care of these cases at the seashore it is important to pay more attention to the clothing than is necessary in the cities. It should be warmer, particularly at night, and when the child is kept at the beach, as it should be the larger part of the time. Improper feeding, and especially over-feeding, often produces relapses at the seashore as elsewhere. When there is much vomiting the bottle should be taken away and nourishment administered at frequent intervals by the tablespoon or even teaspoon. When the child is in a hotel or boarding-house or at points on the beach where many persons pass it should be protected from the annoyance of being stared at by strangers, an infliction that frets some infants exceedingly. A child worn out by a long siege of diarrhoea has no nerve strength to be wasted, and all such disturbing causes add to the exhaustion. Exceptionally these little patients fail to improve even in the most favored localities, but my later experience is to the effect that when they are sent to Atlantic City before their heart force is so far gone as to be incapable of restoration, they may nearly always be saved.

Dr. Daniel Strock, of Camden, was introduced, and opened the discussion of this paper. He fully endorsed the recommendations contained in the paper and believed if they could be carried out the mortality would be greatly decreased. But the difficulty of carrying them out was an important point in the discussion. The great majority of cases are among the poorer classes, and it is impossible for them to take their children to the seashore as the expense to them is too great. The next best thing is to keep these patients as much as possible in the open air, and observe the strictest care as to food and surroundings. He referred to his experience and observation as corroborative of a point made by Miner, that in cases where the little patients were kept on the ground floor and the floor above it the mortality is greater than when they are kept in a dry basement, on account of the lower temperature of the latter. The care of milk after it is received into the house was referred to as a matter of importance.

Dr. T. W. Harvey, of Orange, continued the discussion. He

spoke of the influence of temperature, humidity, and the presence in the great majority of these cases of micro-organisms, which by their presence and vital actions cause the sickness of the child. The great tendency to destructive organic change in our food which is most active during the heated term give these disease germs their introduction into the system and their chance to develop. He advocated strongly a change of air for affected children, believing it acts as a general tonic. Children from New York will get better at Orange, while children in Orange suffering with the same disease generally improve if sent to New York. Dr. Harvey dwelt at some length on the preventive and curative methods of treatment.

Dr. F. Gauntt, of Burlington, spoke of the influence of temperature as having more to do in the causation of these infantile diseases than anything else. We do not have these diseases in the winter months. The mortality in summer is always much greater when the temperature is over 80°. He advocated taking such children in the cellar where we will find it cooler.

The President then introduced Dr. G. F. Wilbur, of Asbury Park, who read the next paper on "The Need of Medical Officers for School Districts."

(See page 127, of this report, for Dr. Wilbur's paper.)

Dr. E. L. B. Godfrey was then introduced to open the discussion. He was aware that the appointment of medical officers for school districts would be an innovation, and many arguments could be adduced both pro and con. He believed, however, that it could not be denied that whatever contributes to the physical well being of a people contributes both to their happiness and prosperity. If the oversight of officers disciplined by special training and specifically conversant with the manner, methods and results of physical training, can be given or possessed by school children at a time before bad physical tendencies are acquired, or before their results become fixed, the highest good can be attained, the pupils and the State reaping incalculable blessings from such oversight. He said it might be argued that such an oversight is the province of the family physician and that such appointments would affect his interest, but the family doctor does not call sufficiently often into the house during periods of health to see and correct these faults. His services are summoned rather for curative than pre-

ventive treatment. He believed the profession generally would sanction the appointment of such officers.

The Doctor then discussed at some length some of the faults that would or could be remedied by such appointments. The construction of school buildings was referred to where children had to climb to the third story, inducing in so many cases irritability of the heart; bad ventilation with impure air; faulty arrangement of desks as to height and especially as to light, so that the eyes are strained, the nervous system injured, many more children than formerly using spectacles, and how contagious diseases could be prevented or their spreading controlled. He called attention in closing to the point that the body developed more rapidly than the mind, and that if the development of the mind is too rapid it will result in a wreck. After all it was not so much what you know, as what you can *do* and *how long* you can do it, that is the practical outcome of our education.

Prof. Landon, of Bordentown, followed in the discussion. He did not claim to know very much on this subject but he was deeply interested on general principles. In his own school he tried to carry out the principles laid down, he had two physicians visit his school and look after the surroundings and health of his scholars. He was a thorough believer in prevention, and his school had thus far escaped epidemics. Much that had been said related to city schools. We should be as careful as to country schools. He said we should have such medical officers to keep pupils in good health, prevent spread of diseases, to support the teacher against the average school committee whose knowledge of sanitary measures is usually exceedingly poor. A good medical officer he believed would help greatly in these directions.

Prof. E. H. Cook, head-master of the Rutgers-College Grammar school, followed in an earnest and practical address, relating his experience and observation as to the care of pupils in the places where he had lived. He strongly advocated the oversight by competent medical officers, of our school buildings, and of the management of our schools, as affecting the health and physical development of the scholars.

He believed the average school teacher knows very little about the care of the body, and he was surprised that so many parents know or care so little about the bodies of their children. He could

never understand why some fathers or mothers would insist on their children washing their hands and face three times a day and their feet about once or twice a year. He thought we had better observe the rule, the school-master for the mind, the physician for the body and the minister for the soul.

George P. Olcott, C. E., of Orange, said, that as a father with six children, he felt there was not a subject before us of greater importance. He had been obliged to take some of his children out of the public schools, because of certain rules he believed were not conducive to health, one being short recess in which to go home, eat dinner and hurry back to school. He had been obliged to send them to a private school where these difficulties did not exist. No man ought to be allowed to serve on a school-board who had no children, ought to be one rule.

James Owen, C. E., of Montclair, said he had been a school trustee, and had much difficulty in adopting rules to suit the views of different parents. He had always insisted on competent medical authority in matters affecting health. Ventilation had been one of the troublesome questions in their Board.

Friday Evening, 7.45 o'clock.

The Association met in the Library of the State House. In addition to the members, a large number of the trustees and scholars of the State Normal School were present.

President Benjamin occupied the chair. Prayer was offered by Rev. J. S. Dobbins, of Trenton, who was invited to sit as a corresponding member.

The Secretary announced the Annual Address by the President, Dowling Benjamin, M. D., of Camden, on the "Thermometry of Hygiene." (See page 69, of this Report.)

The thanks of the Association were unanimously tendered to Dr. Benjamin for his interesting and instructive address, and a copy was requested for publication.

Prof. James M. Green, Principal of the State Normal School, Trenton, was then introduced, and read an able paper on "Physical Culture in the School in its Hygienic Bearings."

(For this paper, see page 121, of this State Report.)

SUPT. A. B. POLAND ON PHYSICAL EDUCATION.

The discussion of Principal Green's paper was opened by Supt. A. B. Poland, of Jersey City, who proposed the question: "Has physical culture any place in a system of school instruction?" This he answered in the affirmative by declaring that the modern definition of education, to wit, the equable and harmonious development of all the powers of the child, included physical as well as moral and intellectual training. Admitting the necessity of some sort of physical culture in schools, the question next arises. What forms are available? He classified the various kinds of physical exercises into the following:

(a) Natural, spontaneous, non-regulated exercises—play.

(b) Artificial, formal, regulated exercise, which includes calisthenics and gymnastics.

Confining then the discussion to artificial hygienic exercise, Prof. Poland sought to prove:

1. That artificial muscular exercises are *necessary*.

2. That they can be *systematized* and *adapted* to the school curriculum.

3. That they can be made *practical* and *efficient* hygienic aids.

Allusion was made to Herbert Spencer's disparagement of formal muscular exercises in lieu of play, on the ground that the pleasurable and spontaneous element of play, essential to its hygienic value was lacking. It was argued in reply to Mr. Spencer that these elements need not be divorced from a system of hygienic exercises. The dangers incident to unrestrained play, its necessary one-sidedness and tendency to over development and deformity were considered. The effect of labor on young children in producing abnormal development was briefly discussed. The general physical deterioration of the masses owing to the now universal use of machines, the specialization of labor and increase of wealth with its attendant luxuries were considered in brief. From the forgoing data it was argued that systematic physical training in our schools was absolutely imperative.

The great efforts made in continental countries, notably France, Germany and Sweden to introduce physical training into schools was cited with commendation.

The objections to the introduction into schools of a system of

physical exercises were considered at length. The main objection is two-fold:

(a) That there is no available system that is scientific and practical.

(b) That the time of the schools is already greatly overcrowded.

In order to prove the possibility of a science of physical training, the speaker laid down the following propositions for the ordering and interpretation of which he claimed there was the basis of a grand science.

1. The vital organic functions of the body require muscular movements for their adequate performance.

2. These muscular movements must be as varied as the diverse functions they aim to assist.

3. They must both in quantity and quality be adapted to the functional demands.

4. They may be natural, or artificial, or both, and the test of their value will be their efficiency in producing the desired end.

Furthermore, a perfect system of hygienic physical training must undertake to apply muscular movements to all their possible uses; to-wit:

1. To secure a perfect physical development when the same is wanting.

2. To maintain the healthful equilibrium when once established.

As a *science*, gymnastics should be founded upon a body of well authenticated and fully classified facts. Its principles and rules should be the safe deductions from the data so ascertained and proved.

The system of Ling, otherwise called the Swedish system, was warmly approved. It was urged that teachers be required to familiarize themselves with the therapeutic and prophylactic value of artificial muscular exercises. There should be no haphazard nor unintelligent work in physical culture. Boards of Education should employ specialists to instruct teachers in gymnastics. Courses of study should lay down obligatory provisions for physical drill. The efforts of the State Sanitary Association to bring about a better state of things in the public schools of the State was warmly commended. Superintendent Poland closed his address by briefly elucidating the following propositions:

1. Public sentiment in favor of introducing rational gymnastics into our public schools is rapidly gaining ground.

2. Most of the systems in vogue throughout the country lack unity and adaptability.

3. A rational system of school gymnastics must be based upon physiological laws, and like a rational course of study, will be obtained only after much experiment and many failures.

4. A practicable system of school gymnastics must take into consideration, also the limitations of the school room, school work, training of teachers, expense of oversight or instruction and other practical aspects.

The science of physiology enables us to lay down the following laws:

1. Muscular growth and development results from rightly executed muscular movements.

2. Rational hygienic exercise is one of the best means of influencing the functional activities of the body, and of securing and maintaining health.

3. The physiological effects of a muscular movement should be determined beforehand, and its force and character carefully proportioned.

4. The effects shall be so classified and localized that the intelligent teacher can apply the right gymnastics for any special case.

5. Exercises should be varied according to the physiological effects intended, and such variation should regard the amount of effort put forth, its quality and continuance.

Special forms of exercise should be devised for the following special ends:

1. To correct any abnormal condition of the blood and its circulation. The pathology of anæmia, headache, heart disease, etc., should be better understood by the teacher and have each its special and appropriate exercise.

2. To secure a deep, calm and powerful respiration. Hence, movements to widen and expand the chest, to increase its mobility, to prevent adhesion of the pleuræ should be devised.

3. To produce strong, vigorous, healthy digestive organs by strengthening the abdominal muscles. Stomach catarrh, hæmorrhoidal complaints, etc., can be reached and remedied to some considerable extent.

4. To give tone, vigor and health to the processes of secretion, and to facilitate the rapid renewal of tissues and the discharge of waste products.

5. To correct any pathological nervous conditions, and produce and sustain a healthy normal nervous system with its mental concomitants. Nervousness, undue susceptibility and sensitiveness to impressions, headache, backache, palpitations of the heart, dullness, tendency to cramps and convulsions, such psychical phenomena as an irritable disposition, melancholia, apathy, morbid sensitiveness, inflamed imagination, can often be prevented or cured by timely and appropriate special exercises.

6. To enlarge, strengthen and make flexible the muscles themselves, giving grace, nobility, pose, capacity and endurance to the general physique.

On motion of Dr. Wetherill, seconded by Prof. Watson, a vote of thanks was presented to Prof. Green and Prof. Poland, for their excellent papers and copies were requested for publication.

J. C. Pumpelly, Esq., said that while it may be true as stated that the science of physical culture is not fully understood, it is clear that the two papers had been given as a logical and instructive presentation of the subject. He spoke of the advance that has been made in favor of physical culture, both among our leaders in education and among the people, and recited what physical culture had accomplished in the Reformatory at Elmira, N. Y.

Prof. J. Madison Watson, of Elizabeth, spoke congratulatory words on the progress in this Association in the direction of physical culture. He believed it was due to the Association more than any or all other influences that the sentiment of educators and scientists of the State has been developed that physical culture or training is a necessity. He believed that where systematic training in the school room was most carefully and faithfully followed, we always had the best mental results. A symmetrical development involves physical and mental training in due proportion. He was glad that we had as President of our State Normal School, one who is a thorough believer in the necessity of both.

Prof. E. H. Cook, of New Brunswick, said he wished to say amen to the two papers, that when he was engaged in Normal school work in New York State, he was impressed with the conviction that there was no factor that would develop so much morality in a school

as was developed by physical training. The results in the Elmira Reformatory were referred to where the rating in morality had nearly doubled in three months. Some might object to the extra time it takes, but he believed if we have now four hours to devote to mental work we will accomplish much more in the mental development if we give ten or fifteen minutes of each hour to physical work. He spoke against high heeled shoes and corsets, believing that they should be abolished, and said he had once in New York city counted 5,000 persons passing where he could observe them and hardly 10 per cent. were of good physique.

Dr. H. C. Wetherill, of Trenton, closed the discussion with an earnest address in favor of physical training, but in opposition to the military drill which he did not believe conducive to the development of a good physique.

Saturday, November 23d.

The second day's session began at 9.30 A. M., President Benjamin in the chair.

Dr. W. K. Newton, of Paterson, read a paper on "The Relation of the Conduits to the Healthfulness of Water." He referred in opening to the different conduits by which water is conveyed from a lake or stream to the consumers: (1) stone and brick masonry; (2) cast-iron pipe, combined iron and cement pipe; (3) wooden pipe; (4) small iron pipes, plain or coated with tar or rustless iron; (5) iron pipes coated with zinc, galvanized; (6) lead pipes.

The Doctor passed the first and second systems as needing little criticism, because if properly constructed no ill-health has been induced by water carried in them. The material of which the service pipe from the street main to and through the house is constructed varies in different parts of the State. In some cities galvanized iron pipe is almost exclusively used, in others lead pipe is used altogether, while in others about an equal proportion of each is used. The matter seems to be regulated to the custom prevalent among the local plumbers. In a very few cases the rustless iron has been used, and if carefully put in, so as not to disturb the coating on the surface, a very safe and satisfactory service pipe is employed. But this cannot, of course, be used for branches to all the fixture.

In the latter case, however, a minimum of lead pipe is used. So-called galvanized iron is merely iron coated with a more or less thin coating of zinc, hence our consideration of the relations of this kind of conduit to the healthfulness of water, has to do with the effect of the metal zinc, etc., and its results on the human economy.

Water flowing through this zinc-covered pipe contains more or less of the metal or one of its salts, and we may state, as the opinion of all scientific men who have investigated the subject, that the amount of zinc present in water drawn from zinc-lined vessels or pipes is innocent and does no harm.

The use of lead pipes for the conveyance of drinking water is always attended with a certain degree of danger, because such water always contains lead, and the danger varies in a degree with the character of the water conveyed, and the susceptibility to lead poison of those who drink it.

The amount of lead present in water is influenced by the following factors: The length of time the water has stood in the pipes or vessel; the length of pipe, or size of vessel, that is the amount of metallic surface to what the water is exposed; the composition of the water itself; the amount of oxygen in the water or at the surface of the water.

Lead being a cumulative poison, a person may absorb minute doses at long intervals before being affected by the poison, and the injection of as small a quantity as 1-100 of a grain of lead to the gallon of water has been known to produce the characteristic symptoms, paralysis, colic, etc.

Water in cisterns lined with lead, where the level is often changed, and where the air gains free access to the water, the water is particularly liable to be contaminated to an extreme degree, and a parallel case is the suction pipes attached to pumps in wells where the level of water is changed often. This form of suction pipe should never be used.

Organic matter, nitrates, nitrites and chloride in water, or even impure water, attacks lead, causing them to dissolve rapidly. Soft, rain and distilled water, or one containing much oxygen, attacks lead more rapidly than hard water. Water containing lime does not attack lead as rapidly as others. When we consider the amount of water drawn from lead pipes that is used every day, and

knowing that nearly all of it contains more or less lead, the wonder is that there are not more cases of lead poisoning.

As there is a real danger, the following rules should be observed: Water should not be used that has been allowed to stand in lead-lined cisterns. Lead suction pipes in wells should be abandoned altogether. Water should not be used that has been allowed to stand in lead pipes for a considerable time; that is, the taps should be opened, and the water allowed to flow for a considerable time before used for drinking or culinary purposes; the last rule should be especially observed with water that has stood in pipes over night.

The discussion which followed was opened by Shippen Wallace, Ph. D., of Burlington, who gave instances and observations which he himself had investigated in the same line. Other points were made by James Owen, Dr. Ballard and others, and by a motion of the Association, Dr. Newton was requested to investigate into the healthfulness of conduits and report at the next meeting of the Association.

The President then announced the next two papers on "Tuberculosis" and "Typhoid Fever in Munich," by Prof. S. G. Dixon, M. D., of the University of Pennsylvania. A letter was read by the secretary from Prof. Dixon expressing regret that he was unable to be present on account of illness in his family, etc., and stating that he had requested his friend and colleague, Dr. Seneca Egbert to represent him. Dr. Egbert was then introduced and read the two papers, offering remarks in explanation and elaboration of some points in the papers. (For the paper on "Tuberculosis," see page 103 of this report of the State Board of Health).

The paper on "Typhoid Fever in Munich" aroused considerable discussion, some of the physicians present being unwilling to endorse all the points, especially as to the causation of typhoid. It began by showing how much might be done for the health of our people by sanitary legislation. Dr. Dixon set forth the work done and the result obtained under the ample provision of law, in the city of Munich, under the excellent supervision and energetic management of "its grand old sanitary professor," Herr Von Pettenkofer. He called attention to many of the statistics given which show a marvellous reduction in death from typhoid fever in that once afflicted city; for example in 1866 to '80 the ratio

of mortality was 332 per one hundred thousand, while that of '81 to 88 was only 42 per one hundred thousand. That during the decline of typhoid fever there, great improvements have also been made in the water supply, yet from tracing the history of these new auxiliary water supplies, they do not seem to have much, if any relation with the decline of this much-to-be-dreaded disease. For instance, an investigation made in 1888, he cited, to show that both the mortality and morbidity has decreased in the same ratio in all parts of the city, including those districts which were still supplied by the highland conduit, which was looked upon as being the most impure of the old water supplies. The writer said that his idea in presenting these facts was not to refute the idea that typhoid infection is conveyed in water; though he was most persuaded that the so-called typhoid-bacillus cannot live in the average water supplied to the cities over four days. His object was rather to picture the danger arising from the pernicious custom of permitting foul matter to percolate through the sides of sewers and cesspools in thickly-inhabited districts that depend upon obtaining their supply of water from shallow wells. Mother earth's disinfecting powers can be overdone. The moment this power is exhausted the grand cycle of life's changes therein ceases, and the polluted earth becomes a habitat for pathological products. In this condition is the earth underlying many of our cities, towns and villages, not only from cesspits but from unsealed sewer walls. Up to this time the permeability of sewer walls has never been provided against, and consequently in most of our thickly-populated centres, Zymotic diseases are on the increase.

Dr. Dixon argued from the intimate relations shown between typhoid fever and the pollution of the subsoil, that we must direct our attention to the prevention of such conditions, and not be allured from this by water fanatics, who claim that at least a great proportion of typhoid in our large cities comes from the water supplies. He referred to the fact that much had been said and written in this regard about Schuylkill water, but that after a number of experiments he had been unable to propagate the bacillus of Eberth, after submitting it for more than four days to Schuylkill water. From these results he thought we must suspect that but few people are inoculated with typhoid fever from Schuylkill water.

Dr. Egbert was questioned in reference to the experiments on

the Schuylkill River water, some of the physicians present holding that they were not conclusive in demonstrating that Schuylkill water is innocent of the charge of being the chief causative agent or conveyancer of disease in many of the typhoid fever cases in Philadelphia.

Dr. Ezra M. Hunt stated that the paper on "Tuberculosis" he regarded as most excellent, and he should request the favor of publishing it in full. It recognized the fact that science is even yet but on the surface of the knowledge of facts, and far from getting to the depths and at the bottom of all the facts. He did not feel that he could indorse all the points in the paper on "Typhoid Fever," and especially the statements so much relieving water of responsibility in producing typhoid.

The paper on tuberculosis was cautious. There is much of speculative philosophy (so called) mingled with biological observation, and too much reasoning from analogies. It is not safe to infer that all that occurs in animals and in culture experiments occurs in man amid disease. "Festina lente" is a good motto, especially where the observations contradict the long experience and general testimony of practitioners. We hail with joy the spirit of investigation, but we need cumulative evidence for conclusions.

Dr. Egbert had brought with him his microscope with many slides, illustrating the papers read, and spoke from his own experience in the investigation of these diseases, thus adding much to the interest of the members in the papers.

A vote of thanks was unanimously tendered to Prof. Dixon and also to Dr. Egbert for their valuable services.

The following resolutions were unanimously passed:

Resolved, That the Association desires to express its deep sense of loss in the death of Dr. J. L. Bodine, a former president of the Association, and also our appreciation of his extensive knowledge of and interest in sanitary science and art.

Resolved, That the president appoint a committee of five to consider the legislation on stream pollution and report a standard or standards of purity for effluents from sewage purification works at the next meeting of the Association.

The president appointed as the committee, James Owen, C. E., W. K. Newton, M. D., Prof. P. T. Austen, C. Phillips Bassett, C. E., and C. B. Brush, C. E.

The executive council presented through the secretary the report of the nomination of officers for the ensuing year, which was unanimously adopted as follows :

President, George P. Olcott, C. E., East Orange.

First Vice President, Hon. E. O. Chapman, Trenton.

Second Vice President, E. L. B. Godfrey, M. D., Camden.

Recording Secretary, D. C. English, M. D., New Brunswick.

Corresponding Secretary, Prof. J. Madison Watson, Elizabeth.

Treasurer, George W. Howell, C. E., Morristown.

Executive Council, (with the above named officers)—J. C. Pumphelly, Esq., Morristown, Chairman. Prof. Chas. McMillan, C. E., Princeton ; C. Phillips Bassett, C. E., Newark ; Rev. Dr A. E. Ballard, Ocean Grove ; John L. Leal, M. D., Paterson ; James Owen, C. E., Montclair ; H. G. Wetherill, M. D., Trenton ; Prof. F. A. Wilber, New Brunswick ; T. R. Chambers, M. D., Orange ; A. P. Hunt, M. D., Somerville ; William Pierson, M. D., Orange ; Prof. E. H. Cook, New Brunswick ; Shippen Wallace, Ph. D., Burlington ; G. F. Wilbur, M. D., Asbury Park ; E. S. Atwater, Esq., Elizabeth ; Prof. A. B. Poland, Jersey City ; Boardman Reed, M. D., Atlantic City ; A. Clark Hunt, M. D., Metuchen.

The president announced the following as the Committee on Legislation : E. S. Atwater, Esq., of Elizabeth ; Hon. E. O. Chapman and Ezra M. Hunt, M. D., of Trenton ; L. B. Ward, C. E., of Jersey City ; D. L. Wallace, M. D., of Newark.

James C. Bayles, M. E., of Orange, has been unable to complete the paper requested of him on "The Present Special Sanitary Needs of Our Cities," and was on motion requested to furnish the paper for the next annual meeting. After the transaction of minor items of business the annual meeting, which was regarded by all as one of the best and most practical of the series, adjourned.

SUMMARY OF REPORTS FROM LOCAL BOARDS

**AND LISTS OF MEMBERS AND HEALTH INSPECTORS, WITH ABSTRACTS
FROM MOST OF THE REPORTS.**

BY THE SECRETARY.

In October in each year, as required by law, a printed schedule of inquiries is sent to each local Board of Health, also containing a blank for the names and post-office address of members of the local Boards and Sanitary Inspectors.

The following is the schedule of subjects :

SUBJECTS FOR REPORT.

- | | |
|--|--|
| A. Location, population, and climate. | N. Almshouse, hospitals, and other charities. |
| B. Geology, topography, and contour. | O. Police and prisons. |
| C. Water supply. | P. Fire-guards or escapes. |
| D. Drainage and sewerage. | Q. Cemeteries and burial. |
| E. Streets and public grounds. | R. Public health laws and regulations. |
| F. Houses and their tenancy. | S. Registration and vital statistics. |
| G. Modes of lighting. | T. Quarantine or care over <i>contagious</i> diseases, and vaccination. |
| H. Refuse and excreta (how managed). | U. Sanitary expenses. |
| I. Markets. | V. Heat and ventilation for dwellings. |
| J. Diseases of animals. | W. Prevalent diseases of the year. |
| K. Slaughter houses and abattoirs. | |
| L. Manufactories and trades. | |
| M. Schools and school and other public buildings. | |

Other subjects may be named under X, Y, Z. The subjects may thus be referred to by the letters.

If the sheet provided is not sufficient add others, marked with the letters which designate the topic treated.

If details on some of the subjects named have been furnished in former reports, these do not need to be repeated. But each item should be carefully examined and full information given under R. It is always best to state what the Board has actually done. Under W no disease should be reported as having been prevalent unless the writer knows of at least ten cases. The medical member of the Board should, if possible, give facts as to any epidemic that has occurred, and should note any special needs or defects in sanitary administration.

We do not find it necessary to publish all of each report, and even those from which we publish nothing are of value for reference in the office. Our space permits us only to select such parts as are new, or as are of special interest to the locality and to this Board. Reports are in general promptly received, but a few Boards are dilatory or seem to regard the report as a formality. We regard them as so important that we must insist upon exact conformity to the law. Those who will examine the abstracts will not fail to get valuable information and have opportunity to compare the work and methods of the various Boards.

LEGAL OPINION.

The following questions as to legal points have been answered thus by Judge William M Lanning, of Trenton:

First. Is a borough located within the limits of a township and in which no Local Board of Health has been organized, subject to the jurisdiction of the Local Board of Health of the township in which the borough is situate?

It is not. The latter part of Section 10 of the Health act expressly provides that "in any township within whose limits a city, borough town or other form of local municipal government now exists, or hereafter shall exist, the jurisdiction of the Local Board of the township shall extend *only* to such parts of the township as are, or shall be, outside of the territorial limits of such city, borough, town or other local municipal government."

Second. May a physician residing in a borough located within the limits of a township, and in which the borough taxes and township taxes are assessed at the same time and by the same officer, be ap-

pointed as a member of the Local Board of Health of the *township*?

I think he may. Section 10 of the Health act provides that the Township Committee, the Township Assessor and one physician to be appointed by the Township Committee, shall constitute the Local Board of the township. If the Assessor or a member of the Township Committee should reside within the limits of the borough, it is clear that that fact would not render him ineligible as a member of the Township Board. If residence within the borough does not disqualify an Assessor or a member of the Township Committee, there is no reason for holding that it should disqualify a physician.

Third. Is it within the power of the Legislature to extend the provisions of the supplement to the Health act relating to plumbing, passed February 22d, 1888, to townships having a population of 2,000 or more?

This question is not easy to answer. The opinion of the Court of Errors in the High License-Local Option law, lately rendered, might possibly be cited as an authority for the exercise of such a power. I think a safer plan would be to extend the provisions of the Plumbing law to those townships in which the density of population exceeds a certain number per square mile, or to those townships which now have, or may hereafter have a public water-supply.

NOTE.—A Township Board is a legal Board without a physician upon it, but it is always best to have a medical member, if there is one residing in the township. If the Local Board does not in such case appoint one, this Board can and generally does. We get our information direct or from the annual report. The office of Township Physician, where there is such an office in the township, does not make the person a member of the Board of Health, but a medical member of the Board is such by appointment. He must reside in the township, but can be a member of a Township Board if he resides in any borough or town of the township in which the Assessor of the township levies tax.

ATLANTIC COUNTY.

ABSECON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

D. H. Bates, Joel Steelman, James W. Lee, Towers Townsend, Frank Champion, Jonathan Hand, M. D. E. H., Health Inspector.

The number of acres in the incorporation is 8,000.

The water supply is wholly by wells. The water is never discolored.

The water has no taste of iron or any other taste; it is generally soft. It has no bad taste at any season of the year. There are no cisterns. The drainage is natural and sufficient. The usual water level secures dry cellars.

The houses generally have cellars and are largely used for storage of vegetables. The tenement houses are occupied by one family.

The cesspools are built with open sides and cleaned by the gardeners.

There are no prevailing diseases.

There are no slaughter houses.

(Signed)

E. H. MADDEN, M. D.

Town Physician.

ATLANTIC CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph H. Borton, President, Atlantic City; Edward S. Lee, Treasurer, Atlantic City; George W. Sheppard, Secretary, Atlantic City; Samuel B. Rose, Atlantic City; Jacob H. Leedom, Atlantic City; Eugene L. Beed, M. D., Atlantic City; Julius Cotz, Atlantic City. Lewis Reed, Jr., Health Inspector.

Population, 12,000, in summer 50,000.

The Atlantic City Water Company get their supply from mill pond and driven wells, and pump to a reservoir in Atlantic City across the meadows through iron pipes. The Consumers' Water Company get their supply from artesian well, at the depth of 1,200 feet, and two more wells are now being driven. Some few houses

get supply from cisterns. Surface wells are not now in existence.

Systems of underground drainage, known as the West system, pumped and forced in vats and filtered now in use over the city.

Surface water drained off by means of trunks and gutters.

Water closets not connected with drainage pumped out by odorless excavation company, composted, sold and carried to main land and used for fertilizing.

Same as last year.

Our city has been unusually healthy the past year, with nothing special to report.

(Signed)

L. REED, JR.
Health Inspector.

BUENA VISTA.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George B. Coxe, Buena P. O.; J. H. Smith, Richland, P. O.; Tobias McConnell, Cedar Lake P. O. Members of Township Committee of said Township.

(Signed)

GEO. B. COXE,
Chairman.

EGG HARBOR CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John J. Fritschy, Chairman, Egg Harbor City; Francis Norman, Secretary, Egg Harbor City; John Schwinghammer, Egg Harbor City; Joseph Fecher, Egg Harbor City.

Although the excessive rains during the past year caused much dampness in cellars and dwellings, the general health of the city has been satisfactory. Some cases of typhoid fever have been reported; but the persons infected brought the disease from Philadelphia.

Four complaints of nuisances were received during the year. The nuisances were promptly abated. The slaughter-houses have been inspected and found in order.

A public bath is being erected and will be opened next summer.

The sanitary condition of our school house is good.

We have two canning factories which are kept clean and neat.

Our cemetery is over a mile from the built up portion of the city and well attended to.

(Signed)

F. NORMAN,
Secretary.

EGG HARBOR TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John C. Fifield, Bakersville; Benjamin Lear, Pleasantville; Samuel A. Smith, English Creek; Dr. Sherman DeMill, Scullville; Theodore Smith, Scullville; John W. Smith, Assessor, Bargaintown. No special Health Inspector.

Water supply—wells.

Cellars used for storage of vegetables, etc.

Principally privies on the surface, and emptied by shoveling out and burying.

No disease among animals this year.

No slaughter house in Township this year.

A new factory on the salt meadows about three miles from main shore and one mile from Atlantic City, using bones and tallow, etc.; quite offensive as it is passed on the way, which seems to be the only complaint.

No prevalent diseases this year; the township has been very healthy. We have a sanitary code; burials, etc., are kept in accordance. Vaccination of school children is not conformed to as the law requires.

During the past year the township has been divided. Two boroughs have been formed, *i. e.* Pleasantville and Linwood, taking nearly one-half of former population in our most thickly-settled districts; therefore, Egg Harbor township is quite scattered, except that portion extending along through Steelmanville, Bargaintown, Scullville and English Creek. We have only two resident physicians.

J. W. SMITH,
Assessor.

GALLOWAY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Boice, Absecon ; James E. Strickland, Leeds Point ; Lardner Scull, Leeds Point ; E. A. Higbee (Secretary), Leeds Point ; Constant Giberson, Port Republic ; Joseph Sahl, Egg Harbor City.

In making the report for the Township of Galloway, have but to say that the Board of Health has but little use in this township. It is large in area, healthfully located, and drained by nature. There are no slaughter houses, nor anything calculated to endanger public health within the township. No contagious disease existing, nor has existed within the township during the present year, neither to the people nor to the animals.

Neither has any disease been prevalent.

E. A. HIGBEE,
Assessor.

HAMILTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John V. Beckett, Chairman Mays Landing ; Daniel E. Iszard, Treasurer, Landing ; Daniel E. Rape, Mays Landing ; Francis B. Glover, Mays Landing ; Andrew G. Stewart, Weymouth ; Charles I. Abbott, Assessor, Mays Landing ; D. B. Ingersoll, M. D., Township Physician, Mays Landing ; Andrew G. Stewart, Health Inspector.

There have been no changes since my last report worthy of a special report, or that would require a special mention, on the subjects as named under the titles of A. B. C. D. and E. That of F. perhaps, might be classed with the above, for I have repeatedly called the attention of the State Board of Health to the utter want of sanitary conditions of many tenement houses. Yet I esteem the subject of so vital importance that I will again mention it. Many of the tenement houses in this township are destitute of that sanitary condition that should be provided in every case. Many of them are not supplied with any water at all. Others with water that "*will do to wash with but is not fit to drink ;*" others with water that "*stinks a little but otherwise it is good.*" And thus these poor and ignorant—in many instances—ones are forced to drink the

infusion of toads and other poisonous substances, or carry the water some distance from their neighbors. These tenants are not aware of the evils resulting from the use of such water, consequently they use it, and very frequently disease and death is the result. If now the Local Board interfere and forbid the use of this water, it will only force those tenants to use the water from their neighbors' wells, and will thus work an annoyance to them and labor to themselves. It will not strike at the root of the matter nor effect a remedy.

Let us have a law accompanied with a penalty that will force the landlord to supply all the necessary sanitary conditions of his tenant houses, and then, if need be, force the local boards to execute that law. In no other way in my judgment can the evils be remedied.

And again, as to the refuse and excreta. This is not properly cared for. Many of the tenement houses have the privies too near the house, and these are not properly cleaned—hence, they become a source of annoyance and discomfort to the family and neighbors, as well as to be the source of greater troubles. The remedy for this might be included under the general law so necessary for tenements and tenement houses.

No changes in I, J, K, L, M, N, O, P, Q, R, S, T, U and V have been made since our last report, nor have there been any prevalent diseases during the year, either of man or of animals.

(Signed)

D. B. INGERSOLL, M. D.,
Township Physician of Hamilton Township.

HAMMONTON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS.

Charles Woodnutt, Hammonton; James P. Patten, Hammonton; Edward North, M. D., Hammonton; James H. Seely, Hammonton; A. J. Smith, Hammonton. Edward North, M. D., Health Inspector.

There is nothing new to add more than has already been given under the above heads.

Our population, we think, has increased considerably since our last report on that subject, probably numbering between 3,300 and 3,500. The Italians who come here as berry pickers are, many of

them, becoming permanent settlers in certain localities of our beautiful town, and will need the watchful care of our health inspector, as to their manner of living, for it is generally known that many of them have a personal antipathy against the external application of pure water, and also another habit of trying to find out how many can occupy the least amount of space at the same time, within circumscribed limits, or in other words twenty will occupy a building that should accommodate but four or five people. Their only salvation from diseases of all kinds is from the fact that much of their time is spent in the open air. Men, women and children spending the whole day in the fields or in their door yards, doing all, or nearly all their cooking in the open air. Thus far we have experienced very little trouble with those living in this neighborhood. We have some times doubted as to whether we got a full report of births and deaths from among this class, but have taken special pains to impress on their minds the importance of this matter and the penalty for non-performance of the same.

(Signed).

A. J. SMITH,
Clerk.

MULLICA TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Theodore Weeks, Green Bank ; Charles Saalaman, Egg Harbor Township
George Huntsman, Pleasant Mills.

No board formed this year.

(Signed),

W. S. MILLER,
Assessor.

SOMERS POINT.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Japhet Townsend, Somers Point ; Fred'k Stuth, Somers Point.

Somers Point, situated on west side of Great Egg Harbor Inlet, bay and river. Population, 400. Climate mild. 1,600 acres.

Water, spring wells, soft and clear.

Drainage, surface ; no malaria and no swamps near by.

Houses with cellars used for storage, and no two tenement houses for families.

Cesspools, half cement and half surface.

No slaughter houses.

No manufactories.

One school house; two rooms.

Canvas fire escapes to hotels.

Two cemeteries.

Laws regulated by council.

No registration.

At present no quarantine necessary.

Sanitary expenses estimated about \$5.

Stoves and heaters for heating purposes.

No prevalent diseases; only colds, etc.

(Signed)

N. D. VAUGHAN,
Borough Clerk.

BERGEN COUNTY.

ENGLEWOOD.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Abram Tallman, James Harris, Henry J. Brinckerhoff, Hardy M. Banks, M. D., G. W. Chamberlain. Post Office Address, Englewood, N. J. John J. Post, Health Inspector.

Population about 5,500. Township about 1,000 more.

The Hackensack Water Company supplies about one fifteenth of the residents of the village of Englewood. They derive this water from the upper Hackensack, source Rockland Lake, pure, spring water, water soft. Is not bad at any season of the year.

None of the inhabitants of Englewood depend on cisterns.

The best of water from wells. Next in quality of that from the reservoir.

The number of families who require this water is rapidly increasing. Water never discolored. No iron. The reservoir is located at New Milford, about seven miles distant from the business portion of the village, and is under a thorough system of cleansing and

purification. Hydrants have been placed in many of the principal streets from which, in case of fires, water can be taken.

No complete system of drainage except a private drain about one eighth of a mile long running through the principal business street (Palisade avenue) of the village. This small drain is of little use, and the Board of Health will speedily have a better and more elaborate one, with proper connections, constructed. The subject is now being agitated, and action will probably be taken at the next meeting of the Board of Health, with a view of having the old drain or sewer removed. Sinks and privies are growing less. The Inspector keeps a lookout on all and whenever he discovers the imperfect condition of any privy, notice at once is given to the owner of the premises to cause the building, vault, etc., to be thoroughly cleaned and cleansed. The east branch of the Overpuck creek, a short distance below the village and upon private grounds, refuse, etc., has been dumped. Orders have been given for discontinuance of the same.

Nearly all the streets and avenues of the town (village) have been macadamized, and by reference to abstract of ratables of the county, particularly from the records of the Road Board of this township, it will be seen that the tax rate for roads, repairs, etc., is greater than any other tax.

All streets are kept cleanly.

The houses are generally well constructed and public and private buildings properly ventilated.

Owners and tenements exercise great efforts in keeping the houses neatly and cleanly.

Gas is used in many of the houses. Both the houses and streets are lighted by gas and kerosene.

Refuse and excreta removed.

The markets (meat and vegetable) are kept properly.

No diseases of animals.

The people of Englewood are ever ready by vote and money to do all they can for the education, comfort and convenience of their children. Less than one year has elapsed since a large addition was added to the old school building. In fact there was a change in the entire building. The grounds have been neatly graded; the child no longer dreads to go to school. The school building is warmed by means of heaters. Nothing allowed either within the

school building or upon the ground attached thereto that may in any wise affect the health of the pupils.

No almshouse, save a poor house to which the needy are taken, when not otherwise provided for from their own means or of their relatives and friends. A physician is employed by the township to visit and ascertain and supply those in feeble health. A hospital building is under consideration; the grounds have been purchased upon which a building will probably soon be erected.

Englewood has a "lock-up." Evil doers fear our Marshal of the Protective Society and Constables of the township.

The fire guards consists of a company of well drilled men, ready to report promptly "on duty" when occasion may require their services.

There are two cemeteries, Mt. Carmel and Brookside, situate near the northern part of the town. The grounds of each are constantly being cared for and neatly kept.

The Board of Health have printed by-laws, which are freely and plentifully distributed. No citizen has an excuse for pleading that he is ignorant of what is required of him to assist in preserving the good health of the village.

Nothing different from last report.

Vaccination under charge of the physician of Board of Health.

Cellars generally dry.

Very, very few basements to houses.

Cesspools built generally with open bottoms. Privies emptied by means of force pump, into closed barrels and immediately carted away by a gentleman owning a team used for that purpose.

No prevalent diseases within the past year.

(Signed)

JOHN J. POST,
Inspector.

FRANKLIN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

We have no Board of Health. Names and addresses of the Town Committee : William G. Ackerman, Wyckoff; Albert Lazier, Campgaw; John Ramsey, Oakland.

The health of the Township has been good for the year.

(Signed),

JOHN W. ACKERMAN,
Assessor.

HACKENSACK.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

J. S. C. Wells, president, Hackensack; J. A. Romeyn treasurer, Hackensack. D. G. Jeffers, secretary, Hackensack. B. B. Barkman, Hackensack; A. D. Brower, Hackensack, M. E. Clarendon, Hackensack; Lemuel Lozier, Hackensack. D. M. W. Heath, Health Inspector.

Water supplied by the "Hackensack Water Company, reorganized." Source at New Milford, three miles above the village, beyond the influences of tide and sewerage. Slight taste of iron, slightly hard. Was discolored during the summer, caused by stagnation of water in the reservoir. Through the efforts of this Board this has been remedied, instead of using the larger reservoir an iron tank of much smaller size has been built inside the reservoir, insuring a constant fresh supply. The reservoir is regularly cleaned and the hydrants are regularly blown out. In many of the older houses and in streets where water mains have not yet been laid wells and cisterns are used.

Natural drainage to the Hackensack river. Excellent sewerage system, built under the supervision of competent engineers of the Hackensack Improvement Commission. It consists of large brick outlets with pipe laterals, and are thoroughly flushed twice daily by the tide, and are ventilated by manholes throughout its entire length. The surface water is drained into the creek, which runs just beyond the inhabited portion of the village and thence into the Hackensack river, into the sewers and directly into the river. The usual water level is such that dry cellars are assured. During the past year, however, by reason of the heavy fall of rain, many cellars not contiguous to the sewers had water, but they were generally pumped dry as soon as possible.

Seven miles of macadamised streets, which are being extended annually. Sixteen miles of stone sidewalks. Streets, walks, and public grounds in good condition.

Basements not generally occupied. Few tenements.

Streets have been lighted by gas until within two months. Electricity is now used for this purpose. Gas is used in residences and places of business. Oil is also extensively used. Electricity is now being introduced for private use.

Refuse is removed by scavengers. Sewers are generally used by houses contiguous to them. Cesspools are required to be laid up

with cement and to be water tight. Cesspools are cleaned by an odorless excavating company.

No epidemic

Local slaughter houses only. Kept in good condition under direction of Health Inspector.

One silk mill employing about 300 hands (male and female).

Three public, one parochial and one kindergarten schools, all under excellent management, and are properly heated and ventilated.

Hackensack hospital, an admirably managed institution, containing about twenty beds, almshouse not in the village. Township cares for poor

Well disciplined fire department (volunteer). Abundant water supply. Alarm bell with street signal boxes.

Cemeteries, with one exception, not in town. Strict regulations with regard to burial of persons who have died from contagious diseases.

We are revising our ordinances and will send copy.

Our expenses were unusually heavy the past year, by reason of our suit against the Bergen County Board of Freeholders.

Furnaces and stoves.

About twenty cases of scarlet fever, all in light form. Investigation by this Board shows that nearly all the cases were due to out of town influences. There was an unusually large number of persons affected with measles. No serious cases.

(Signed)

D. G. JEFFERS,
Secretary.

HARRINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles L. DuBois, Chairman, P. O., Northvale; Barney N. Ferdon, P. O., Closter; Abraham M. Knight, P. O., Closter; Isaac Kipp, Secretary, P. O., Closter; H. A. Crary, Physician, P. O., Closter.

There has been no complaint made to this board during the year of any nuisance.

As regards diseases, the only prevailing diseases we have had this year has been a severe type of malaria with a typhoid tendency,

that has prevailed during the summer and autumn, and also an epidemic of dysentery that has been quite prevalent throughout this township during the months of September and October.

There has been no contagious diseases among animals in this township during the past year.

ISAAC KIPP,
Secretary.

HOHOKUS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William H. Murray, Ramseys ; Lewis H. May, Ramseys ; William Thurston, Ramseys ; Abraham Banta, Mahwah ; C. P. DeYoe, Ramseys, physician. Lewis H. May, Health Inspector.

One of the northern townships of Bergen County, northern boundary, the New Jersey and New York State line. No large towns.

Surface undulating.

Wells furnish water almost entirely. Natural drainage to public sewers.

Houses generally well built with cellars. No tenement houses.

A number of cesspools.

No prevalent disease among animals.

Slaughter houses well kept ; not much used.

The school buildings, most of them built within the past few years.

No contagious diseases.

C. P. DEYOE,
Physician.

LODI.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Van Bussum, Corona ; James Van Bussum, Garfield ; Henry Stromeyer, Little Ferry ; S. Martin Tygert, Physician, Carlstadt.

The supply by wells and cisterns about equally divided.

T OF THE BOARD OF HEALTH.

ainage, cellars usually dry.
r condition ; no public grounds.
lly have cellars, used for the storage of vegetables,
occupied by their owners.
xcreta used for feeding domestic animals, and for
oil.
has been prevalent among animals.
; no slaughter houses, abattoirs.
school houses and six churches
are two fire companies in the village of Carlstadt.
are three cemeteries in the township.
c health laws and regulations are under the control of the
Board of Health.
The vital statistics are collected by the Assessor of the town-
ship.
The township physician attends to such matters.
More sanitary expenses has been voted by the people.
ing houses mostly heated by wood and coal stoves, and
ventilation obtained by the old method of doors and windows.
There has been no prevalent diseases this year.
(Signed) JOHN VAN BUSSUM,
Secretary.

MIDLAND TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James Taplin, Chairman, Maywood ; J. R. Oldis, Rochelle ; O. T. Labriekie,
Ridgewood ; Nicholas G. Hopper, Assessor, Ridgewood.

A, B and C were reported in previous years. No change.

Water supply, wells, cisterns, springs and two rivers.

Hackensack water works situated in the eastern part of township,
supplying Hackensack, Hoboken, etc., with water.

Drainage is provided for by ordinary means.

Roads are being worked in the old way, but more interest is
being manifested and the condition greatly improved.

Excreta are disposed of in privy vaults. Slop water in cesspools.

No markets.

No diseases of animals.

No slaughter houses.

Five school houses, all of which are nearly new and in good repair. Two chapels and three churches.

One almshouse.

No cemeteries, but private burial grounds and vaults.

The sanitary improvements this year have been the removing of a nuisance caused by a pig sty situated near the public road near Cherry Hill. Complaints having been made it was at once removed upon being notified by one of the board.

Prevalent diseases. Malaria but less than former years.

ORVIL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Bernard O. Blenis, Saddle River; O. M. Jennings, Saddle River; George B. Smith, Allendale. Charles W. Badeau, Allendale, Health Inspector.

Orvil Township is situated in northern New Jersey. The climate is changeable but healthy.

The land is rolling.

Wells, natural springs and running streams.

Natural drainage.

Mostly frame houses, and mostly occupied by owners.

Kerosene used for lighting.

Excreta carted on land.

Markets, none.

One cotton mill in operation, one woolen mill not running.

Five public and one private school, two public halls.

Two cemeteries are in the township.

Public laws.

All returns made to me are returned to Trenton.

There has not been any contagious diseases. The doctor attends the vaccination.

(Signed)

ABRAM H. ACKERMAN,
Assessor.

PALISADE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Milton Turnure, M. D., Tenaflly; John H. Huyler, Tenaflly; Alfred Jarvis, Tenaflly; N. C. Demarest, New Bridge; J. H. Anderson, Schraalenburg.

There has been no survey made.

The lands are drained into the brooks.

The waters are well cared for.

No method for removal of excreta.

Nothing especial to report.

(Signed),

JOHN H. HUYLER,
Assessor.

RIDGEFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John S. Edsall, Chairman, Leonia ; John C. Abbott, Treasurer, Fort Lee ; Joseph Schlosser, Jr., Vice President, Fort Lee : John H. Mannix, Assessor and Secretary. Alex. Clendinen, M. D., Coytesville, Health Inspector.

Ridgefield Township is situated in the southeasterly extremity of Bergen county, and is bounded on the south by Hudson county, on the east by the Hudson river, on the north by Englewood township, and on the west by the Hackensack river. It contains about four thousand inhabitants, of almost every nationality (Chinese excepted). The climate is good and the locality unusually healthy.

The eastern portion, with the exception of a valley about an eighth of a mile in width, running along the Hudson river from Fort Lee to the Hudson county line at Shady Side, is about three hundred feet above the level of the river. This portion is very stoney, while a mile to the westward, all the land extending westward is perfectly level and almost completely void of any large stone ; the greater portion of this part of the township is used for agricultural and farming purposes.

The water supply is chiefly from wells and cisterns, but a number of private houses on the west side of the township obtain their supply from the Hackensack Water Company, whose pipes extend through the township, north and south.

There is no sewerage, the natural lay of the land carrying all overflows very efficiently to the river on either side.

The streets or public roads are under the control of the Public Road Board, which is composed of seven commissioners, they being constituted under a special act for this township alone. The roads

are macadamized, and will compare favorably with any in the county. There is only one public park in the township, and that is situated at Coytesville, on the Palisades, and commands an uninterrupted view of the Hudson river, which runs about four hundred feet below, and an exceptionally fine bird's-eye-view of New York City, the City Hall of which is about ten miles distant, due south.

The houses are chiefly frame and are mostly occupied by but one family, a house containing more than one family being the exception. The mode of lighting the houses is almost exclusively by kerosene lamps. The refuse is seldom if ever allowed to accumulate, it being usually satisfactorially disposed of daily.

There are five meat markets in the township, but it is a rare occurrence for any of them to kill anything larger than a calf occasionally, and great care is always taken that no nuisance shall arise from such slaughter to the neighbors, or in fact, any one else.

There is no disease of animals worth mentioning, the most being among horses, and they usually may be accredited to general debility, old age, &c.

There is an oil refinery at Edgewater which employs about 100 men; a chemical works at Shady Side employing 150 men; a sash and door factory at Edgewater employing 30 men; a dye works at Nordhoff employs 50 men and women; two piano action factories at Fort Lee employ 40 men, and a book bindery at Coytesville employs 15 men. About 100 men find employment at Fort Lee and vicinity in making Belgian paving blocks, from the blue stone quarries, which are very plentiful in that neighborhood.

There are seven public schools, two parochial schools, and one institute for the education of females, presided over by the Sisters of Charity. There are two public halls, one at Leonia and the other at Fairview. There is no alms house, hospital or other charitable institution in the township. There is no prison, but an abundance of officers, there being no less than 25 at Fairview and vicinity, members of the Protective Association; a very recent organization known as the Law and Order Society, composed of about 10 active members or marshals, and three constables at Fort Lee. There is one volunteer fire company located at Fort Lee, but the fires are few and far between. The houses are so constructed that fire-escapes are considered unnecessary. There are three cemeteries, one at Ridgefield, one at Fort Lee and one at Edgewater. There are no

vaults, the burials being entirely in ordinary graves. The local Board of Health are guided entirely by the laws and regulations sent to them from time to time by the New Jersey State Board of Health, and when occasion requires it they act promptly without fear, favor, or partiality.

The vital statistics department is in the charge of the Assessor, who collects the marriages, births and deaths, and once in each month forwards the same to the Vital Statistic office at Trenton, as required by law.

The sanitary expenses are defrayed by individuals, who deem it necessary to make alterations or improvements for their own convenience and health, and not by any public appropriation.

The township has not been visited by any contagious diseases during the last year past, and taken altogether the last year will compare favorably with any preceding one, notwithstanding the annual increase in population, which is owing in a measure to the vigilance of the local Board of Health in suppressing any thing which would tend to become a nuisance and eventually detrimental to the health of the public.

JNO. H. MANNIX,
Assessor.

RIDGEWOOD.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. A. King, Chairman, Ridgewood ; Edward Keeley, Ridgewood ; John G. Hopper, Assessor, Ridgewood ; Dr. J. T. De Munth, Medical Member, Ridgewood ; William Macchi, Inspector ; Ridgewood.

The health of the township during the past year has been very good.

There has been three complaints made to the Board, and in each case the causes of the complaint was abated.

Our water supply is usually from wells, which when not contagious to privies and cesspools is good.

There have been no cases of contagious diseases among live stock reported to the Board of Health.

(Signed)

THOMAS TERHEUN,
Secretary of Township.

LOCAL BOARDS OF HEALTH.

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SADDLE RIVER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry A. Hopper, Fair Lawn; Peter Alyea, Dundee Lake; Wm. H. Doremus, Paterson; Isaac A. Hopper, Fair Lawn.

There has been nothing special to report.

No prevailing epidemics. We have been comparatively healthy this year. The board has been called out but once.

(Signed)

ISAAC A. HOPPER,
Assessor.

UNION TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Stephen Trautwein, Kingsland; John Kehoe, Lyndhurst; David Brown, Rutherford; A. L. Watson, Secretary; Samuel E. Armstrong, M. D., Health Inspector.

Since our last report Union Township has undergone division of territory, and what used to be Union is now split up into two portions, that part northeast of the Erie Railroad being known as Boiling Springs Township, and that southwest of the same dividing line retaining the name of Union. Our territory by this means has been reduced about one-third. The township, as it now exists, is made up almost entirely of a ridge of land extending from the limits of the borough of Rutherford on the north to the Essex county-line on the south, being bounded by the Passaic river on the west and the Hackensack on the east. It is evident from this description that the natural drainage of the township is quite perfect.

There are two school buildings, accommodating fifty scholars and two teachers in the one and the other one hundred and thirty scholars and four teachers.

Diphtheria, scarletina, and measles have prevailed to a limited extent in certain localities; proper isolation and disinfection has been insisted upon by the local Health Board.

(Signed)

SAMUEL E. ARMSTRONG, M. D.,
Health Inspector

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WASHINGTON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alonso House, Mont Vale ; Gilbert Ackerman, Park Ridge ; John C. Blauvelt, Westwood ; John H. Wortendyke, Passack, Assessor.

Nothing additional to add from last year's report.

(Signed)

JOHN H. WORTENDYKE,
Assessor.

BURLINGTON COUNTY.

BEVERLY TOWNSHIP.

There is nothing to report about Beverly Township that is new, the general health of the inhabitants has been good, and free from epidemics.

(Signed)

CHARLES VANSCIVER,
Secretary of the Board of Health.

BURLINGTON CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edward S. Lansing, Burlington ; Shippen Wallace, Burlington ; Robert Wain, Burlington ; J. Hutchinson Lukens, Burlington ; William H. Kimball, Burlington. Charles Stowell, Sanitary Inspector by Board of Health.

The water supply is from the river Delaware. It is a public supply by the city. Nearly all houses in the city take the water. Water is discolored when there is a freshet in the river. No iron or other taste. It is soft. Not bad at any season of the year. Reservoirs and pipes cleansed at stated periods of the year. No sewerage of consequence. Very few depend upon wells for water supply ; none on cisterns.

There is an almost perfect system of drainage by a pumping station at "Sluice" in this city. The water level is such as to secure dry cellars. No swamps of consequence. No malaria now.

Only sewer for a few blocks on York street, this city.

Houses generally have cellars ; not occupied. Very few are

used for vegetables. Very few houses occupied by more than one family.

Cesspools are used. These are cemented, built of brick, emptied by men, having night soil wagons.

No prevalent diseases. No contagious diseases among cattle.

Slaughter houses inspected, cleanly; they are not a nuisance to neighbors.

CHESTERFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles B. Holloway, Chesterfield; Simeon Hannold, Crosswicks; John F. Rogers, Crosswicks; Charles T. Haines, Crosswicks; T. W. Ridgway, Chesterfield.

Wells and cisterns furnish the water supply.

Open gutters are used for drainage.

All cellars are used for storing vegetables.

No houses with more than two families.

Principally open bottom cesspools are in use.

Hog disease has prevailed across North End Township.

One slaughter house is located in the township.

CINNAMINSON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William R. Lippincott, Cinnaminson; Isaac Evaul, Palmyra; E. H. Ogden, Riverton; Timothy Morton, Parry; Alexander Massy, Jr., Riverton.

The health of Cinnaminson Township has been unusually good during the past year.

No epidemics have occurred. We have had but little typhoid fever, and malaria troubles are not at all frequent.

The villages of Palmyra and Riverton are supplied with most excellent water by a private corporation. Their works have just been completed, and as yet but few people have taken their water.

This supply is derived from a large well dug near the Delaware

river, and this water is distributed from an eighty thousand gallon tank, located in a field a mile from the source of supply.

They have no system of sewerage, but the Township Committee have under consideration a plan of sewerage for a portion of Riverton, and it is hoped that this can be extended, from time to time, until it meets the wants of both villages.

(Signed)

ALEXANDER MASSY, JR,
Secretary.

DELRAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Heiss, Riverside, Assessor; John Folz, Riverside; Henry Freck, Riverside; Elwood P. Austin, Bridgeboro. Dr. Alexander Small, Health Inspector.

Fifteen hundred inhabitants.

Streets and drainage are good.

No public grounds.

Shoe factory and hosiery mills in the township.

Two schools; no other public buildings.

Two cemeteries are located in the township.

EVESHAM TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David D. Griscom, Marlton, Richard H. Leeds, Marlton; David T. Ballinger, Marlton, Township Committee; P. V. B. Stroud, M. D., Marlton. William L. Brown, Assessor.

Nothing new to report. Families are supplied with water by wells; generally good. Considerable underdraining to fit land for agricultural purposes, and yet some cellars have water in them in the spring of the year, or unusual wet times. No swamp of any extent.

The health of the inhabitants of the township believed to be good average.

The Assessor has inquired and not heard of any contagious diseases amongst animals.

There are two slaughter houses in the village of Marlton. They have been inspected and are not complained of as a nuisance.

(Signed)

WILLIAM L. BROWN,
Assessor.

FLORENCE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Kale, Florence ; John Peacock, Florence ; Robert Cottom, Florence ; Joseph West, Florence ; Charles A. Baker, Florence. Charles A. Baker, M. D., Health Inspector.

Malarial diseases have been prevalent during the entire year.

We have had no typhoid fever here for several years. This is attributed by the health board to our natural drainage facilities.

In the lower portion of our town, known as "Foundry Town," where most of the workmen reside, the most active measures are required to preserve a good sanitary condition.

The water closets back upon narrow alleys, which are difficult to keep clean and from which offensive odors arise.

A new cemetery (since last report) has been located near Florence station. Several burials have taken place there. No residence nor wells, however, are located near it.

The cesspools at Foundry Town are not cemented. The contents are removed occasionally and dumped on a neighboring farm.

CHAS. A. BAKER, M. D.
Secretary.

LITTLE EGG HARBOR TOWNSHIP.

(Including village of Tuckerton.)

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. M. Berry, F. French, Eph. Berry, Committee ; Alfred Palmer, Assessor ; T. T. Price, M. D., Secretary. T. T. Price, Health Inspector.

Water supply is from wells.

Surface drainage and pretty good. No sewerage.

Cellars under all houses of pretension. Houses frame.

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Out-houses: Cesspools, or boxes emptied once a year are used.

Comfortable frame buildings for schools.

Cemeteries are not near populous part enough to be disagreeable.

Vital statistics are fairly well attended to.

No contagious diseases to report.

Neuralgia has existed to some degree.

We have had no epidemics the past year among men or animals.

The Buffalo gnat or horn-fly was very annoying to stock during the summer. It had not been observed before this year in this locality.

(Signed)

THEOPHILUS T. PRICE.

Inspector.

MANSFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. A. Ingling, Assessor, Columbus; **B. H. Atkinson**, B. T. Warren, Wm A. Townsend, Committee, Columbus; **D. G. Van Mater**, M. D., Columbus.

The water supply is a natural one, moderately soft.

No sewers. Drainage as a general thing good. Some water in cellars in lower part of Water street.

Most of the houses have more or less vegetables in cellars at this season of the year. There are about one hundred houses and about five to a house.

Ordinary water closets in use.

Slaughter houses are out of town.

There are public schools, private school and town hall.

Columbus Cemetery is located in the township.

Nothing particular to report as regards prevalent diseases.

(Signed)

D. C. VAN MATER,

Inspector.

MEDFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR,

Elwood H. Kirkbride, Medford **Henry L. Garwood**, Medford; **J. Reeve**, M. D., Medford; **Charles H. Kirby**, Medford.

All the subjects from A to W have been answered in former reports, and there is nothing further to add.

In reference to subject W, would report that the year has been unusually healthy and free from contagious diseases, except for a few weeks after the new year, when we were visited by diptheria in a malignant form; nearly all the cases could be traced to contact with those who had had the disease or who had been in contact with it and had not changed their clothes. The number of cases were comparatively few, but the mortality high, about eighteen per cent. It showed an unusual disposition to attack the trachea, and great efforts were made to isolate the cases and disinfect the houses and it soon disappeared. There was a recurrence of typhoid fever at Chairville, a village one and a half miles from Medford, there being six cases, five in persons who had moved into the place within a year. I might state that this village, which contains only sixteen houses, has had, to the best of my knowledge, in the past ten years over forty cases of typhoid fever with a number of deaths. In 1888 there were no cases, the first year for eight years that it escaped. The wells have been cleaned out, but not this year, and the water from some has been declared unfit for use, though apparently all right so far as the taste and appearance goes. The soil is a sandy loam, and there are no cesspools. It has been the case for a number of years that every new family that moved into the place had the disease, and four-fifth of the cases have occurred in August each year, though this year three commenced the latter part of July. The first appearance of it ten years ago was in cold weather, always after that in hot.

(Signed),

J. REEVE, M. D.
Inspector.

NEW HANOVER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPCCTOR.

Benjamin Remine, Chairman; L. D. Woodward, William Poinsett, Thomas Platt.

There have been no contagious diseases among the inhabitants of the said township. The health has been good as far as reported.

The inhabitants are taking more care in drainage; they find it a great help in securing good health. Something should be done to compel them to return the births to the proper persons so they would get sent in to the State Board of Health. There is great neglect in the physicians of the said township.

No contagious epidemics among animals heard from.

(Signed),

BENJAMIN REMINE,
Assessor and Chairman of the Board of Health.

PEMBERTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Hollingshead, Pemberton; Joseph S. Budd, Pemberton; W. K. Budd,
Members of Board.

NORTHAMPTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Richard C. Barrington, M. D., Chairman; George H. Branson, Inspector;
Samuel A. Atkinson, Clerk; Joseph C. Kingdom; J. Fred Laumaster.

Water supply is from Rancocas Creek, and is used generally by citizens. Water works operated by private subscription. Water is soft and considerably discolored, said to be caused by streams running through cedar swamps. Very agreeable to the taste. The creek receives no sewage above point of supply. Some wells in town; water generally good. No cisterns used for drinking water.

Sewage system in part of the town and works satisfactorily. Some defective drainage in places where the sewer does not run, but as a rule drainage is good. Wet cellars in some parts of the town not infrequent. Malaria not usual with us,

Houses generally have cellars. No tenement houses.

Sewers are used to drain about half the town; system will probably be extended. Very few cesspools.

No prevalent diseases. Assessors do not inquire as to losses of animals, but contagious diseases are reported to board.

LOCAL BOARDS OF HEALTH.

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Slaughter houses are inspected and kept in good condition.

(Signed)

GEORGE H. BRANSON,
Health Inspector.

TABERNACLE TOWNSHIP.

There is no Board of Health in the Township of Shamong.

(Signed)

W. S. HAINES,
Assessor.

SOUTHAMPTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. H. Haines, John W. Haines, Francis C. Naylor, Committee ; Charles G. Naylor, Assessor; John C. Brown, M. D.

Population 700.

Water supplied by wells.

No two families live in the same house. No storage at all of vegetables. No basements. No cellars.

Cesspools built open; generally carted out on farm land.

There have been no diseases of animals of any kind during the year past.

(Signed)

JOHN. C. BROWN, M. D.,
Inspector.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Gustave Voss, Green Bank ; George Wright, Bastro ; Somers Sooy, Green Bank ; A. E. Koster, Assessor, Green Bank.

The water supply is good. It is taken from wells and springs. No need for sewers.

Most houses have no cellars. Those which have are used to store vegetables.

REPORT OF THE BOARD OF HEALTH.

There are no slaughter houses in Washington township.

The general health is good.

(Signed)

A. E. KOSTER,
Assessor.

WESTHAMPTON TOWNSHIP.**NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

R. R. Barrington, M. D., Mount Holly ; Jos. G. Parker, Mount Holly ; Jos. W. Gardner, Mount Holly ; Geo. W. Frazier, Smithville. Geo. W. Craig, Clerk and Inspector.

WILLINGBORO TOWNSHIP.

We have no Board of Health in our township.

The names of the township committee are Oliver Parry, Beverly ; A. J. Jorden, Burlington ; Alex. Thomson, Rancocas.

(Signed)

J. M. STOKES,
Assessor.

CAMDEN COUNTY.**CAMDEN.****NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

George F. Hammond, 20 South Third street, Herman W. Miller, Southwest corner Eighth and Mt. Vernon street ; Chas. W. Watson, 432 Federal street ; Wm. T. Head, 601 West street ; T. P. Varney, City Hall ; John W. Donges, 1801 Broadway ; George R. Fortner, 542 Federal street. Eugene B. Roberts, City Hall, Health Inspector.

The water supply is taken from the Delaware river, and is supplied by the city. Fully two-thirds of the houses receive water from that source. It is at times very much discolored, caused by heavy rains or high tides in the river. The reservoirs are cleaned when deemed necessary. The supply of water is more or less contaminated by the sewerage, which empties into river from Philadel-

phia and Camden. There are a number of wells in the outlying parts of the city, from which water is used, but very few cisterns.

As a general thing the drainage is very good, but on account of the low ground along the river front, we have had considerable trouble during the past summer by having water in a great number of cellars. There are also vacant lots in different parts of the city, which at times are covered with stagnant water, but the Board of Health are compelling the owners to fill them up as rapidly as possible.

The houses in almost all cases have cellars. Basements very seldom used except for storage purposes.

Cesspools are constructed according to sanitary code by being built of brick and cemented on sides and bottom, causing them to be water tight. Excreta is removed from the city in tight box wagons or air tight barrels.

There have been no diseases among animals to the knowledge of the Board of Health during the past year. The city does not keep a register of persons having horses and other animals.

There are several slaughter houses in the city and they are kept in good conditions. All drain into sewer and are inspected every week.

The city is supplied with two hospitals and one dispensary, which are partly under control of city and a Board of Directors, all being well managed institutions.

All factories and large buildings are provided with fire escapes. The erection of same being governed by law.

There are three cemeteries, namely, Evergreen, Old and New Camden, situated in city limits. The Board of Health closed up Butler's Cemetery during the year on account of violations of law.

The city is governed by the sanitary code of the Board of Health.

Health expenses are paid out of money appropriated by City Council.

Heating of buildings is principally done by stoves and furnaces, in some instances by steam.

Diphtheria and typhoid fever has been the most prevalent diseases during the year.

(Signed)

EUGENE B. ROBERTS,
Health Inspector.

CENTRE TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Ezra C. Bell, President, Mount Ephraim ; Joseph M. Haines, Mount Ephraim ; David A. Shreve, Haddonfield ; John H. Jackson, Haddonfield. William B. Jennings, Haddonfield, Health Inspector.

We are glad to say that we have been very much favored with good health and have had no contagious diseases during the year.

We think it has been an unusual year for good health generally.

The Board has not been called out to abate any nuisances, and our inhabitants seem to take more interest in keeping all things pertaining to the welfare of health in a better condition than in former years.

(Signed)

**JOHN H. JACKSON,
Secretary.**

DELAWARE TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

William Graff, Chairman, Ellisburg P. O.; William D. Coles, Assessor, Ellisburg P. O.; E. Winslow Coffin, Ashland P. O.; John A. Meredith, Haddonfield P. O. W. S. Long, Health Inspector, Haddonfield P. O.

As this Board has fully complied in a former report with the requirements of the State Board for general information relating to the township we omit a repetition of the matter. We are glad to be able to report the absence of contagious and epidemic diseases in man. Four cases of typhoid fever have been reported. Ten (10) cases of Typhoid Pneumonia in cattle—none fatal. Seven cases of supposed Texas fever occurred in one drove recently brought from Philadelphia—three of which proved fatal. No report of these was made to the Board. No complaints of nuisances of any kind have been presented. The Health Inspector has made regular visits to each school, and while the buildings have not in all cases been constructed according to the recommendation of the State Board, as regards windows facing the pupils and in one instance the absence of a storm door, the health of the pupils has

been exceptionally good, the teachers reporting freedom from all epidemic and contagious diseases. Vaccination is not carried out as fully as it should be.

(Signed)

W. S. LONG,
Secretary.

GLOUCESTER CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. A. Walmsley, M. D., President, Gloucester City; Duncan W. Blake, M. D., Gloucester City; William J. Thompson, Gloucester City; E. J. Steer, Gloucester City; Patrick Mealey, Gloucester City; William H. Guy, Gloucester City; Dr. John K. Burnett, Health Inspector.

Gloucester City is located on east side of Delaware river. Newton creek is on the north and Little Timber creek on the south side. The population is between seven and eight thousand. There has been no epidemic in the city; but a few cases of scarlet fever, measles and croup. The water supply of the city is principally from a reservoir located along Newton creek, which furnishes pure spring water; when said supply is not sufficient, they receive water from the creek.

Council has appropriated \$18,000 for sewers for the present year, which are being built of brick and cement pipe. Have found that a number of houses along the line of brick sewers, that have had from ten to fifteen inches of water in cellars, have been thoroughly drained since sewers have been laid.

The streets of city (on advice of Board of Health) are having gutter-stone laid where they are not paved, and gravelled from gutter to gutter, and in rains throws the water into gutters which is carried off by sewers to Delaware river.

For street lighting, the light is supplied by the Gloucester City Electric Light Company, and our city is as well lighted as any of its size in the State.

We have ten policemen and one lockup; three public schools and one private school.

Six hundred dollars have been appropriated by City Council for Board of Health for year.

DANIEL F. LANE,
Secretary of the Board of Health

GLOUCESTER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Brewer, Blackwood; Seth C. Bishop, Kirkwood; Joshua B. Sickler, Chew's Landing; Joseph E. Hurff, M. D., Blackwood, Jos. S. Stewart, Chew's Landing.

HADDON TOWNSHIP.

The township officers of Haddon township did not organize as a Board of Health this year.

J. STOKES COLES.

STOCKTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Leolf Reese, M. D., Cramer Hill; Benjamin P. Abbott, Cramer Hill; George Mollneaux, Cramer Hill; Charles Pedigree, Cramer Hill; H. K. Leddinger, Cramer Hill, Health Inspector.

Stockton township is situated between Coopers creek and Pensaukin creek, river Delaware and Camden city. Generally about thirty feet above the Delaware river. Population about 7,000. Climate temperate.

Soil, sandy; no minerals. Ground rolling.

Water is good, with few exceptions, and is procured from sunken wells, from thirty to seventy feet deep.

There is no underground system of drainage, all being surface, on a natural grade to river and creeks.

The streets are unpaved and there are no public grounds.

Houses are frame, occupied only by single families.

There are but few street lamps, and these, as well as private lamps, consume coal oil.

The excreta is used as a compost on farms, and no complaints have been made of cesspools.

We have no markets.

No special diseases of animals are reported or known.

There are no slaughter houses.

There are two woolen mills, a soap works, and chemical works.

There are 15 school houses, built of wood, with two exceptions, fairly ventilated and kept in good condition as to repair and cleanliness.

There is no almshouse, no hospitals and no public charities. When needed, the county almshouse is used.

The police force consists of three constables. No prisons.

One fire apparatus. Hook and ladder and buckets.

We have three well kept cemeteries, and one pauper burial ground about to be declared a nuisance on account of its crowded condition, and containing two and three in one grave. It is situated one mile from the present centre of population.

No regular code of health laws is established, but the Board of Health is preparing it.

Registration and vital statistics are kept by the Assessor.

There have been no contagious diseases. Vaccination is generally carried out.

All the heating is done by stoves burning coal.

The health of the township has been very good. The diseases being principally light cases of malaria and the usual diseases of children.

There have been several nuisances abated on the notice of the Inspector.

(Signed)

H. K. LEDDINGER,
Inspector.

WATERFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

B. W. Bennett, Berlin; John Hampton, Berlin; Wm. Haines, Berlin; W. D. Walton, Gibbsboro; Wm. H. Norcross, Berlin; Edward Stafford, Glendale.

Waterford township commences ten miles south of Haddonfield, and runs along the line of the C. and A. R. R. a distance of fifteen miles.

The water supply is from natural springs and wells.

Natural drainage by means of running streams toward the Delaware river.

Country villages streets not named; public grounds none.

Principally farmers.

No prevalent diseases are reported.

Two slaughter-houses.

Only one extensive manufacture, that the paint firm of John Lucas & Co., situated at Gibbsboro. Balance made up of farmers and Philadelphia business men. There is one glass-house at Atco.

There are seven public schools.

Cemetery situated in Berlin.

Typhoid fever has been prevalent in some degree.

(Signed)

W. D. WALTON.

Assessor.

WINSLOW TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

H. M. Jewett, Winslow P. O.; Elias Russell, Sicklerville P. O.; Charles Albright, Elam P. O., Committee. M. G. Burdsall, Wilton P. O., Assessor.

There is no physician in the township.

There have been no prevalent diseases the last year in the township.

There is nothing of especial interest to report.

(Signed)

M. G. BURDSALL.

Assessor.

CAPE MAY COUNTY.

CAPE MAY CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. H. Phillips, M. D., President, Cape May City; Wm. F. Cassidy, Secretary, Cape May City; Chas. Foster, Cape May City; Wm. Essen, Cape May City; J. P. Hand, Cape May City; Geo. Young, Health Inspector.

Cape May City on Atlantic Ocean at southern point of New Jersey. Climate mild and equable.

From well, pumped by water works and distributed in mains,

and used by most of the houses ; it is always clear, no taste, is pure and soft all the year round. Reservoirs are cleaned at least once a year ; only a few use well water. I know of but one citizen. City water is used in all places for drinking where it is distributed.

Drainage is mainly through sewers. Most cellars are dry. There is no malaria.

There are four or five houses with basements, which are used for kitchens. There are few tenements occupied by two families.

Sewers are used in the thickly settled parts of the city. Cess-pools are open at bottom, when full emptied by dipping out and carried off.

There has been no prevailing disease the past year.

Slaughter-houses are not allowed in the city limits.

(Signed)

E. H. PHILLIPS, M. D.,
President.

DENNIS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John F. Goff, East Creek; Edmund W. James, Dennisville; Remington Corson, South Seaville; Morris Warwick, Dennisville, Assessor; G. G. Carll, South Dennis, Township Physician.

We have nothing in the schedule of subjects that has not already been reported.

The general health of the township has been good. No epidemics or contagious diseases to report. In two cases where nuisances were likely to occur, timely warnings of the board have been heeded, and the board has not been called on to abate them.

(Signed)

MORRIS WARWICK,
Assessor.

LOWER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Stephen W. Weeks, Cold Spring; William C. Town, Cold Spring; William O. Rutherford, Secretary, Cold Spring; William L. Cummings, Fishing Creek.

The Board of Health of Lower township beg leave to submit the following as their report for the past year.

198 **REPORT OF THE BOARD OF HEALTH.**

The health of our township has been very good indeed during the whole year. We have had no contagious diseases among our inhabitants. The Board of Health was called on to drain some low grounds in the vicinity of Cold Spring and after looking in to the laws of State Board we ordered the parties that made the complaint to abate the nuisance themselves which they did. This occurred last April. It was an unusually wet spring but the standing water did not cause any sickness. The sanitary condition of our township has been looked after by our local board, and all matters coming under this notice have had due attention. There has been no disease among horses, hogs, or any other animals the past year, and our farmers are encouraged in keeping a larger quantity of stock and take pains to do all they can to keep them in a healthy condition.

(Signed)

WM. C. RUTHERFORD, Secretary,
STEPHEN WEEKS, Chairman,
WM. L. CUMMINGS,
WM. C. TOWN.

MIDDLE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel E. Douglass, Cape May C. H.; Townsend W. Garretson, Cape May C. H.; I. M. Downs, M. D., Cape May C. H.; Howard C. Buck, Rio Grande; Stillwell H. Townsend, Burleigh.

The water supply is either from dug wells or driven ones.

Cellars are mostly used for storing vegetables. I think there are six houses with two families.

Cesspools have open bottoms.

Slaughter houses are all in good condition.

The general health of the people of this township has been good for the past year. There have been no epidemics of any character, either among people or animals.

(Signed)

STILWELL H. TOWNSEND,
Secretary.

UPPER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Richard S. Godfrey, Tuckahoe; Griffin Corson, Petersburg; Sylvenas Corson, Seaville; Reuben S. Robinson, Tuckahoe; Randolph Marshall, M. D., Health Inspector.

We have nothing of interest to report this year. No epidemics have prevailed and no complaint has been made to Board of Health.

(Signed)

R. MARSHALL, M. D.
Inspector.

HOLLY BEACH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edward Tunis, President; Martin L. Harrison, Secretary; William H. Bright. James Brannan, Health, Inspector.

This Board has nothing new to add to the report of last year. Our city has been very healthful the past year, and the members of the Board are taking more interest in their work, and are doing their best to bring this place up to a good sanitary condition. There are numerous drawbacks to contend against, but are becoming less, as the inhabitants see the necessity for vigorous and prompt work.

Our water supply is derived almost exclusively from cisterns, over which we exercise a close watch and see that they are kept in a clean and wholesome condition. We also have some few wells in use, with pumps, but are used chiefly for laundry purposes.

We have no system of drainage established as yet, depending altogether on surface drainage, which is totally inadequate.

Our houses have no basements or cellars, being raised from one to two feet from the ground, and our greatest trouble is in the number of houses under which water stands through the fall and winter.

Our cesspools are provided with water-tight receptacles and the contents removed semi-weekly from May to November, and at least once a week during the winter, and oftener if found necessary,

the work being done by this Board under contract, over which we exercise a close supervision.

Have had no prevalent diseases. A few cases of mild malaria and three (3) cases of diptheria, all in the one house, one case terminating fatally.

We are at present forming a plan to divide our city into four (4) parts, which we will designate as No 1 Sanitary District, and so on, each member of the Board to have the charge of one district; and we hope by this means to establish a friendly spirit of rivalry between the members of the Board, as each one will vie with the other in having their district in the best shape, and as each member would then only have a small portion of territory to overlook, it would not only simplify their work, but the citizens of that district could see that their member was taking the interest in the work that he should.

(Signed)

MARTIN L. HARRISON,
Secretary.

OCEAN CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. Conner, Ocean City; Benjamin Newkirk, Ocean City; Harry Sutton, Ocean City; Jacob Steelman, Ocean City; J. S. Waggoner, M. D., Ocean City.

My report of Ocean City will differ very little from last year. The general health has been good; some derangement of the bowels during the summer, but very easily controlled. We have had no prevailing diseases, although in the early part of last winter we had a visitation of scarlet fever, but it proved to be of a very mild type; in all, there were some eight or ten cases, but no deaths. We controlled its spreading by keeping all children of families afflicted with the disease from attending school until all danger was passed.

(Signed)

J. S. WAGGONER, M. D.,
President of Board.

SEA ISLE CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

R. H. Lee, Borough Clerk, Uriah Huntley, Assessor; I. P. Delaney, Wm. Luhman, George W. Urquhart, M. D.

Cistern water, with one exception. Continental Hotel has an artesian well. No sewers.

About three houses out of two hundred and seventy-five have basements ; no basements are occupied.

Edison system and coal-oil lamps, latter mostly in winter.

No sewers, no cesspools. Tight boxes, six inches above the ground, emptied in summer twice a week, winter twice a month.

No slaughter-houses in the city.

Our city for the past year has been unusually healthy.

(Signed) .

R. H. LEE,
Borough Clerk.

WEST CAPE MAY BOROUGH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPCCTOR.

Thomas H. Hughes, President, Cape May City; Joseph H. Brewton, Secretary; Downs Edmunds, Cape May City; Daniel F. Crowell, Cape May City; Frank Newkirk, Cape May City.

We have been very much favored this year. No contagious disease of any kind. Health in the Borough has been good. Our water supply is chiefly from surface wells, although we have quite a number of driven wells, and the water from them is most excellent.

The Board of Health has only been called out once this summer to abate a nuisance, and that was the waste water from manure piles running into a well, which was at once attended to.

We had one slaughter house in our Borough, but it was kept in a good condition and no complaint made concerning it. Our school building is in a good condition, well aired, and stands on a high and dry piece of ground, and good health abounds among the children.

We have no health inspector.

(Signed)

JOSEPH H. BREWTON.

CUMBERLAND COUNTY.

BRIDGETON.

When I first received your blanks for report of our Board of Health, I wrote you that this city had no board, but that an ordi-

nance was being framed creating a new Board. The ordinance was duly passed and a board elected, but owing to a flaw in the ordinance the same was set aside and a new one drawn, which also proved to be erroneous. We have now a third one which has passed its second reading, which if correct will take effect February 15, 1890.

(Signed)

CHAS. B. MOORE,
Recorder

COMMERCIAL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Seth Bowen, Chairman. Constant A. Hand, Henry C. Mayhew; Daniel T. Howell, Assessor; David McElwee; Dr Samuel Butcher, Physician. Dr. Samuel Butcher and Seth Bowen, Health Inspectors

Water supplied by wells and natural streams, usually soft and always good; not bad at any season of the year. Nearly all depend on wells.

No system of drainage except by ditches and roadways; we have no sewerage. At Port Norris, the land is low; in the spring they often have water in the cellars. At Mauricetown, Haleyville, Buckshutum and Bailey, the land is high and the cellars are dry.

We have along Maurice river, in this township, reaching from Port Norris to nearly the northern boundary of the township, about fifteen hundred acres of swamp, and what was formerly banked meadow land, which meadow was very valuable until the owner allowed the banks to go down, and the meadows and swamp now are inundated and overflowed, and grows up in wild oats in the summer, which dies down. In the spring, this has a very offensive smell, so that many have made complaints that they have to put their windows down at night to keep out the smell of decayed vegetation, and the Board holds that it causes malaria, which we have been troubled with more since these meadows have been out, and we would be pleased if some method could be adopted to get relief from this evil.

(Signed)

DR. S. BUTCHER,
SETH BOWEN,
Health Inspectors.

DEERFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Elijah R. Parven, Assessor, Deerfield street; Henry M. Dare, Committee, Rosenhayn; Phineas Hires, Committee, Deerfield street; Joseph Golder, Committee, Deerfield street; Dr. Chas. C. Phillips, Deerfield street.

I have for some time been thinking about and investigating into the sanitary condition of our township, with a view of rendering my annual report, but can find nothing special or different from previous years. From the extreme dampness of the past months, and the luxuriant vegetation, we anticipated a prevalence of malarial and typhoid diseases, but as yet such has not been the fact, for we have had but very little sickness and very few deaths. No epidemics have visited us, the conditions requisite do not exist—no stagnant pools of water, no manufactories, the few slaughter-houses well conducted, residences well heated and properly ventilated. Not only is it healthy as regards the human race, but the lower animals appear to suffer less from disease than in some other parts of the State.

Our Board of Health has regular meetings, and by proper ordinances and regulations endeavor to impress upon the people the necessity for their own good, as well as the public at large, to take all precautions for the maintenance of the health of the township.

(Signed)

DR. CHAS. C. PHILLIPS,
Secretary.

DOWNE TOWNSHIP.

P. H. Leaming, Joel Husted, Edward D. Fleetwood, Committee; A. P. Glendon, Physician; George Chance, Assessor.

Downe township is located on Delaware Bay.

The population is 2,000.

Climate is mild.

Water supply is from wells.

Drainage and sewerage is such as found in country townships.

Roads are indifferent.

Houses and tenants are good.

Mode of lighting is by oil.

Excreta is used as fertilizer.

Two slaughter houses, and well kept.

One can house.

The principle trades are oystering and farming.

There are five school houses, and are well kept.

The two public buildings are good.

There are four burial places.

The public health laws are carried out by the Board of Health.

Registration returned by law.

GEORGE CHANCE,
Assessor.

FAIRFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Mark S. Westcott, Fairton; E. O. Davis, Fairton; James H. Elmer, Fairton;
Dr. J. C. Applegate, Health Inspector.

Located in the western part of the county along the Cohansey river, extending to the Delaware bay. Population about twelve hundred (1,200). Climate mild and temperate, with rather dense atmosphere.

Sandy soil with dry bottom and is very porous. Topography generally low, with the town elevated and gradually sloping to the Delaware bay and Cohansey river. Contour, south of Bridgeton, east of Delaware bay and Cohansey river, north of Lawrence township and west of Deerfield township.

Water supply from wells

Drainage is natural into the Cohansey river.

Streets and public grounds are high and kept in good condition.

Frame houses with cellars, tenanted by laboring class of people.

Lighting by lamps.

Refuse and excreta deposited in out houses and removed by night carts.

No markets.

No diseases of animals.

One slaughter house and kept in first-class condition.

One glass house employs about seventy-five men and boys.

Schools are located on high ground with good surroundings, courses and graded.

No almshouse or hospitals.

No police or prisons.

No fire guards or escapes.

Two cemeteries located a mile from the town.

Vital statistics are forwarded by assessor of township.

Laws of vaccination disregarded.

Heating principally by stoves.

Various forms of rheumatism and a contagious skin affection diagnosed "Tinea Favosa Epidemis."

The health of our community during the past year has been exceedingly good, due in most part in our opinion to the heavy rain-falls giving rise to high tides, which carry with them an important factor in disease among us, the malarial poison.

No regular house-to-house inspection has been made, but general inspection and close observation have been practiced during the whole year, from which we have nothing unfavorable to report, except that the laws relating to vaccination have been wholly disregarded.

The force at the glass manufacturing establishment has been increased from fifty to seventy. An excellent supply of water, free from gaseous discharges, is now furnished them.

Our water supply for the town is entirely from wells.

Dwelling houses are sufficiently high to secure dry cellars generally, which (cellars) are, in a few instances, utilized for the storage of vegetables, etc.

In regards to the management of the slaughter house and out-houses that might readily become nuisances, we can only report favorable.

Rheumatic affections have been more prevalent among us than usual ; this, we attribute to the unusually wet season.

An occasional case of typhoid fever has come under our observations, but in every case all the necessary precautions were taken to prevent the spreading of the affection.

No disease among animals has been reported. No epidemic has occurred except a contagious skin affection, mostly among children, which was transmitted to us from Port Norris through a child.

Every one who came in contact with one of these became a victim—about twenty-five in all. It was purely local and responded readily to local treatment with parasitocides.

We learned of Dr. Sharp that it spread extensively in Port Norris, and yielded about in the same manner. Where or how it originated we do not know.

J. C. APPLEGATE, M. D.,
Inspector

GREENWICH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel R. Mills Chairman, Greenwich; John N. Glaspell, Secretary, Greenwich; William P. Gest, Greenwich; Samuel M. Watson, Greenwich; Dr. S. M. Snyder, Health Inspector

The Board met in May and organized. As there were no complaints made to the Board and they did not know of any nuisances, there was no business for the Board to attend to.

Our township is in a healthy condition.

The canning of tomatoes is quite extensively carried on, with a great deal of credit to the managers and with no detriment to the community. The refuse is carted to the neighboring fields and in a few days is plowed under.

We have no epidemic among people or animals.

(Signed)

DR. S. M. SNYDER,
Health Inspector.

LANDIS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Judson L. Beck, M. D., President, Vineland; I. D. Eilenberg, Vineland; James Chance, Vineland; W. W. Whiting, Vineland; George Davidson, Secretary, Vineland.

Slaughter houses are inspected quite often, especially during spring and summer.

Tillyer Bros., glass works. Nothing injurious to health.

GEORGE DAVIDSON,
Secretary.

LAWRENCE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Henry S. Garrison, Cedarville; Ephraim Bateman, M. D., Cedarville; Herbert O. Newcomb; Enos T. Blackwell, M. D., Physician. Cedarville. No Health Inspector.

The health conditions of this district do not vary materially from those reported last year. No complaints have been made to the Health Board, and there have been no diseases pointing to a preventable source. No business or trade has been carried on in such a way as to create apprehension or danger. Sanitary expenses are at a minimum. No allowance is made, as far as I am aware, by the Township board for public vaccination, and no work of that sort is done.

Bateman's Hall is the only building reaching a height of three stories; it has no fire-escape. No disease can be said to have been prevalent. Among animals there has been no general disease, and deaths are only occasional. The educational interests of the place are well cared for, the buildings suitable and well ventilated, and no abuse is known to exist in connection therewith.

ENOS T. BLACKWELL, M. D.,
Secretary.

MILLVILLE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edwin Conover, President, Millville; Samuel Misskelly, Millville; Richard Radcliffe, Millville; Silas C. Smith, Millville; T. C. Wheaton, M. D., Secretary, Millville; L. H. Hogate, Millville; Josiah H. Murphy, Health Inspector.

Millville has had a comparatively healthy year. The local Board of Health has been watchful and active and to this fact is largely due the healthy condition of the city.

The Health Officer was a paid officer for the three summer months, and he, with the Board, inspected many places, and gave personal attention to all complaints.

The death rate during the year ending August 31st, was 147; the highest during any month was 29 in August. The causes of death have been numerous, but none showing prevalent diseases;

nine deaths were from pneumonia and twenty two from consumption.

The water supply of the city is the same as heretofore—from water works and private wells. The water from the former is soft but has a small quantity of iron in it; it is used quite extensively for drinking purposes. There is no known pollution at the source of supply. The pipes were frequently flushed and kept clear of any impurities.

The drainage of the streets is not as satisfactory as the Board could wish, because of the level surface. The city has expended \$5,000 on roads and streets this year, and they are kept in very good condition. We have no sewers and all drainage is surface drainage.

The cesspools have received proper attention, very few of them are cemented, however; they are cleaned and emptied under a city ordinance.

There are numerous slaughter-houses in the city, but they are so well managed that there have been no complaints made against them.

One nuisance in this city is the hog-pen, and there has been considerable complaint in this direction. This question will be doubtless settled before another year.

In closing we wish to thank the State Board for valuable circulars and assistance rendered whenever sought.

(Signed)

L. H. HOGATE.

Secretary.

STOW CREEK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles O. Bowen, Chairman, Shiloh P. O., Edward H. Sheppard, Roadstown; David Ogden, Greenwich; Ephraim Mulford, Assessor, Roadstown, Dr. Joseph Tomlinson, Roadstown

The water supply is by wells and cisterns. Almost all depend on wells. I do not know of but one family that depend on cisterns. Many wind mills are used to raise the water. Depths of wells from 60 to 100 feet perhaps.

No system of drainage. Cellars are nearly all dry. There are many swamps, few ponds, and not many cases of malaria.

Houses nearly all have cellars, and many used for storing vegetables. No tenement houses of more than two families.

Cesspools have open bottom and sides.

No known prevalent disease. The Assessor sometimes makes inquiries, but not as a customary thing.

No slaughter house in township at present.

No manufactories in township.

Three school houses in good condition, hall in two, and cellar partly under one.

One cemetery, but small.

No registration and vital statistics, except what is kept in the Health Board. A short record of each marriage, birth and death is sent to the Assessor.

The Board of Health has never been called upon to exercise any care over any case of disease whatever, and pay no attention to vaccination.

Heating is by stoves. Coal is extensively used. No system of ventilation.

No prevalent disease among man or beasts. But the season has been a wet and very unproductive one, particularly of fruit, caused, perhaps, by the many heavy wind storms of the season.

EPHRAIM MULFORD,

Assessor.

ESSEX COUNTY.

BELLEVILLE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Eastwood, President, Belleville; Richard P. Scaine, Belleville; Chas. Coase, Belleville; I. F. Wisschusen, Belleville; George T. Casebolt, Belleville; William Connolly, Assessor, Belleville; D. M. Skinner, Town Physician, Belleville. Edmund J. Sandford, Health Inspector.

There is nothing to add to former reports of special interest.

(Signed)

D. M. SKINNER,
Health Inspector.

BLOOMFIELD TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Theo. H. Ward, President, Frank T. Benson, Reuben N. Dodd, Charles L. Selbert, George W. Cook, Charles H. Bailey, M. D., Samuel H. Baxter, Health Inspector.

Bloomfield is supplied by the Orange Water Company, a private corporation of East Orange. The water is not introduced in all the houses in the streets through which the mains pass, such people still using their old wells, but in all the new houses the water is introduced. The water is pure and hard.

We have no drainage system. As a rule we have dry cellars. Some in the low lands were flooded during the severe rains of the past summer. We have little swamp land, and malarial diseases this summer were less than ever before. We have no sewers.

Most houses have cellars. How much the poor people use them for storing vegetables is unknown. In the neighborhood of factories, as in the Watsessing district, most of the houses are occupied by two families.

No sewers. Some cesspools are cemented, but in the new buildings, where they are sunk in grade, they are laid up with loose stones, so as to allow percolation through the side walls.

As a town we are enjoying unusual health. We have had no epidemics during the past year. The assessor inquires concerning the loss of animals and contagious diseases.

We have no slaughter houses.

(Signed)

CHARLES H. BAILEY, M. D.,
Health Physician.

CALDWELL.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

G. Munson Canfield, Assessor and Secretary, Caldwell; J. M. Mead, Caldwell; H. V. N. Jacobus, Cedar Grove; S. Van Order, Caldwell; Frank C. Goble, Verona; E. E. Peck, M. D., President, Caldwell.

During the past year Caldwell township has not been visited by any epidemic and but few sporadic cases of contagious diseases have occurred.

The principal source of annoyance comes from the desire of a

few farmers to have dead horses and night soil deposited on their lands, but these nuisances have been promptly abated as soon as reported.

(Signed)

E. E. PECK, M. D.

President.

CLINTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Ira Meeker, President, Irvington; M. Osborne Christian, M. D., Secretary, Irvington; Abram Voorhees, Assessor, Irvington; J. W. Fisher, Waverley Park; William H. Goldsmith, Newark; John Keegan, Manhattan Park; Louis E. Voorhees, Irvington. M. Osborne Christian, M. D., Health Inspector.

The health of the township for the past year has been excellent. No epidemics. Zymotic diseases scarce. Following the freshet of July 30, we had a few cases of malarial fevers taking on typhoid symptoms. Probably due to the overflow and deposit from the East Orange dumping grounds located at Vailsburgh, at the headwaters of the Elizabeth river. Hygienic conditions are good and excepting the occasional incursions of Newark scavengers we have few annoyances.

(Signed)

M. OSBORNE CHRISTIAN,

Secretary.

EAST ORANGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

G. E. P. Howard, Chairman, East Orange; T. R. Chambers, M. D., Secretary; Richard Coyne, East Orange; N. M. Culberson, East Orange; David Wilson, East Orange; J. Frank Smith, East Orange; Abraham H. Ryan, East Orange; Francis A. Nott, East Orange; Thomas E. Vermilye, East Orange, and Henry E. Jepson, East Orange. Henry Blanrock, Health Inspector, East Orange.

Population, over 12,000.

There is a probability that before next report the town will be lighted by electricity.

The schools and school buildings in excellent trim, but crowded. The land is bought and plans are being studied for a new high school building.

The Board of Education, which was formed some six months since, has been doing excellent and progressive work. Each district has lost its old trustees, and they, with the funds and possessions of each district, have become merged into one body, the Board of Education. It was through this means that the steps have been taken for the new high school. The Smead system of ventilation, with the exception of their "closet" system, has met with unanimous approval and will be employed.

The sanitary and plumbing codes have been provided for the township in pamphlet form, one of which is sent with this mail to the State Board. The plumbing code has received many changes from that proposed by the State Board.

Connections have been made with our sewer system, and it is working and promises to continue to work satisfactorily.

Expenses of the Board amount to \$701.50.

(Signed)

T. R. CHAMBERS, M. D.,
Secretary.

LIVINGSTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David Flyn, Livingston; Nelson Smith, Livingston; Bern W. Dickerson, Chatham; Alson H. Walker, Roseland, Frank Meeker, Livingston. George E. DeCamp, Secretary, Roseland. Dr. E. E. Peck, Health Inspector.

The health of the township has been good for the past year. There have been no complaints to the Board of Health of any kind in regards to any contagious diseases. There has been no prevalent diseases of any kind.

(Signed)

GEORGE E. DECAMP,
Assessor.

MONTCLAIR.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Wilson, Chairman; Isaac Denby, George Inness, Jr., A. Eben Van Gieson, Warren S. Taylor, J. S. Brown, M. D., Physician; R. P. Francis, M. D., Inspector; Robert B. Harris, Secretary.

For two years there has been a public water supply in the town, managed by a private company. The water comes from a large well sixty-three feet deep, at the bottom of which are four artesian wells from thirty to sixty feet deep. Another artesian well has been sunk near the first well but has not yet been used. There is no known source of contamination for the water, and an analysis made in August last shows it to be of excellent quality. (*Vide appended report*). At present about six hundred families are supplied with public water.

Montclair, lying as it does on the side of the Orange mountain has a natural system of drainage that is, undoubtedly, one of the chief reasons for the well-known healthy condition of the town. There are no swamps in the region, and the usual water level is such that in but few houses is there any difficulty in keeping the cellars dry.

There is no artificial system of drainage or sewerage in the town, but steps have already been taken to investigate the best methods of sewerage available, and it is expected that before long some definite action will be taken.

The majority of the houses have cellars, and, as a rule, vegetables are not kept in them.

A few cesspools are cemented, but the majority are built with open bottoms and sides. Many of the cesspools are now built so as to be self-emptying by syphonage into one or more adjacent cesspools. The remainder are emptied by the odorless excavating apparatus and the contents deposited on land well removed from any dwelling.

The town almshouse is in good condition and the health of the inmates excellent.

Enclosed is a copy of the last health ordinance passed in June, 1889. Copies of this were sent to every householder in town.

The past wet summer, following an equally wet spring and winter, has been, in some respects, almost an ideal one for breeding disease; but it is very gratifying to note that the town has been remarkably healthy during this period. No sign of an epidemic of any kind has been seen, and another proof has been given of the naturally healthy location of Montclair.

PROF. CHANDLER'S REPORT.

The water so examined was taken from both extreme ends of the service, No. 1 being drawn from the pumping station at Watchung, and No. 2 from the last hydrant on Orange road, where the water is but seldom disturbed, and therefore liable to become discolored.

The tabulated certificate of analysis, and the accompanying letter explaining the results, were as follows.

Enclosed please find the results of the examination of the two samples of water taken by Mr. Pellew. You will notice that they are presented in two different forms for your convenience.

The results are very satisfactory. The waters show no evidence of contamination. The absence of nitrites and the small amounts of free and albumenoid ammonia and sodium chloride are the most important indications of purity. They show a trace of phosphates, and the amount of nitrogen in the form of nitrates is rather high, but this is often the case with excellent waters drawn from cultivated regions.

The water is a little hard, and will undoubtedly make incrustations in boilers. The tube which Mr. Pellew brought back with him contains incrustation which consists chiefly of carbonate of lime, with a little carbonate of magnesia and a trace of phosphate of lime, and a little oxide of iron, just such a deposit as this water would be likely to produce.

Very sincerely yours,

C. F. CHANDLER.

The samples of water from Montclair, N. J., sampled by C. E. Pellew, marked "No. 1 from pumping station," and "No. 2 from last hydrant on Orange road," submitted to us for examination contain in one U. S. gallon of 231 cubic inches:

	No. 1. Grains.	No. 2. Grains.
Appearance in 5-foot tube.....	clear. colorless.	turbid. yellowish.
Odor.....	none	none
Taste.....	none	none
Chlorine in chlorides.....	0.6177	0.8246
Equivalent to chloride of sodium.....	1.0191	1.3588
Phosphates.....	traces	traces
Nitrites.....	none	none
Nitrogen in nitrates.....	0.1441	0.1441

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	No. 1. Grains.	No. 2. Grains.
Free ammonia.....	0.0009	0.0012
Albumenoid ammonia.....	0.0067	0.0058
Hardness equivalent to carbonate of lime. Before boiling.	6.1578	6.4377
“ “ “ “ After boiling.	2.7991	2.6591
Lime.....	2.4491	2.5574
Magnesia.....	0.7481	0.8764
Oxide of iron and alumina.....	traces	0.1638
Soda.....	0.5409	0.7213
Potassa.....	0.1259	0.1281
Sulphuric acid (s o 3).....	0.3587	0.3447
Equivalent to sulphate of lime.....	0.6098	0.5861
Organic and volatine matter.....	0.9622	0.8165
Mineral matter.....	8.4412	9.8747
Total solids at 110 degrees.....	9.4034	10.1912

(Signed)

RICHARD P. FRANCIS, M. D.,
Health Inspector.

MILLBURN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. M. Deen, Short Hills; E. B. Renwick, Millburn; Chas. H. Robb, Millburn; John D. Parkhurst, Millburn; B. F. Lord, Millburn; Isaiah Williams, Assessor.

Wells and cisterns furnish water.

Drainage, especially in lower part of village, is very bad. There is a plan under consideration to remove a certain pond-dam and restore certain streams to their natural courses, also instituting a system of ditches through lands surrounding this pond, in order to thoroughly drain them. If such work should be done, it would undoubtedly benefit not only the lower portion of the village, but much of the township. There is no system of sewerage, save at Short Hills, which is altogether private.

The Inspectors have visited every place in the village proper, and have advised the cleaning and removal of all privies, and collection of garbage, which they have thought necessary. The citizens have, in a great measure, removed any nuisance thus advised, but some have been quite remiss in that respect.

There has been no epidemic of any kind. There have been a few cases of diptheria of a bad type. I must say the health of the township has been very good for the past year.

NEWARK.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Fon. Joseph E. Haynes, Newark; Ald. Alex H. Johnson, Newark; Henry R. Baker, Newark; Tyler Parmly, Newark; Dr. T. B. Mandeville, Newark; Dr. Charles M. Zeh, Newark; Dr. H. C. H. Herold, Newark; S. S. Sargeant, Newark; Wm. B. Guild, Newark. Health Officer and Secretary, Dr. D. L. Wallace.

It is with great pleasure I am able to inform you that the contract for a new water supply has been signed. It is to be taken from the head waters of the Passaic and according to the contract is to be delivered in two years' time.

We have at present time 178 miles of streets in city of Newark. Of these 135.87 are graded. Of the 135.87 miles of grade streets 46.45 are paved. The majority are paved with cobble stones, but within the past few years this has been discarded and all new streets are paved either with oblong granite blocks, Belgian blocks or asphalt. The last mentioned has recently been adopted, genuine Trinidad asphalt, with a substantial concrete foundation being laid. We have now three-fifths of a mile of this pavement, and when spring opens we expect to pave a number of our present dirt streets with this beautiful pavement.

Up to November 1st we have laid and have in use in the city 82.61 miles of sewers, of which 47.59 are of brick and 35 02 of pipe.

During the past year the Board of Health have given this subject close consideration, and the members have visited the different western cities to examine the various plans used. As regards the disposition of garbage our Board is satisfied that the "Merz System," whereby certain portions are utilized, is the best and entirely devoid of offense and completely within the bounds of strict sanitary requirement.

We are now looking into a method for the disposition of refuse from vaults and cesspools, and we hope in a short time to adopt both.

We have at the present time considerable diphtheria and some typhoid fever in our city. While there are a few cases of scarlet fever it is of a mild type, very few deaths having occurred.

A committee of the Board is now considering the advisability of placarding houses where contagious diseases exist, and also the arranging with the trustees of the Newark City Hospital for a wing

in that institution to be used for cases where isolation cannot be practised at the patient's house.

(Signed)

DAVID L. WALLACE.
Health Officer.

ORANGE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George H. Hartford, 63 Ridge street, President; Francis J. E. Tetreault, M. D., 110 Main street, Orange; Augustus Eichborn, 54 Essex street, Orange; John T. Platt, 23 Chapel street, Orange; Stephen Collins, 9 Collins street, Orange; Chas. Buttner, M. D., Secretary and Health Inspector.

The water supply is by the city and the quality of the water has been entirely satisfactory during the past year. Impurities caused by decaying stumps in the reservoir have been removed. The reservoir is supplied by a small river, with no pollution above the point of supply. The pipes are regularly flushed by the proper officer as often as may be necessary. There is no perceptible taste and no discoloration; the water is soft.

As a general thing the drainage is good, the outlet being Parron brook and Second river. Much could be done by this city to better the drainage by having Parron brook widened, deepened, and straightened, so as to provide for heavy rain-falls, such as we have had during the past summer. The common council has taken the necessary steps looking toward such an improvement. There are in different parts of the city vacant lots, which are at times covered with stagnant water, producing complaint and disease; but the Board use all means in their power to correct this condition by either draining or filling up such lots.

The subject most important to Orange is effective sewerage, but little progress has been made in that direction. We are still a cesspool town, cesspools being simply sunk in the ground and only cleaned when complaint is made and the owners are compelled to comply. The contents are removed either by an odorless excavator or by the dipping process into barrels and removed from the city and covered.

There are no slaughter houses in the city, and no swine are permitted to be kept in the city limits.

A handsome new brick school house, costing \$30,000, was erected during the summer, and fitted with the most approved sanitary appliances, under the personal supervision of Mr. Aug Eichborn, a member of this board, to whom much credit is due. No child is allowed to enter school without having been previously vaccinated.

Our factories are all in a fair sanitary condition and no new manufactories have been added.

We have this year adopted a new sanitary code, in which nuisances are defined and measures taken for abating the same satisfactorily.

During the year quite a number of streets have been macadamized, gutters curbed and paved and many sidewalks have been flagged.

During the past year the health of the city has been good. This has been particularly so in regard to diarrhoeal diseases in children, there being few cases and of a very mild type. There occurred about one hundred cases of scarlet fever, mild in character and with very little mortality.

The system of a house-to house inspection, inaugurated several years ago, is still continued and extended, and is productive of very much good.

Sanitary expenses are provided under the law of 1887, the Board submitting its demands to the common council, which body allow such proportion as they deem proper. So far the amounts allowed over the per capita of five cents have been satisfactory.

Contagious diseases must be reported by the attending physician and are quarantined, when in their opinion it is necessary. Physicians are allowed twenty-five cents for each report they make.

(Signed)

CHARLES BUTTNER, M. D.,
Health Inspector.

SOUTH ORANGE BOROUGH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Arnold Tanzer, South Orange; Henry Lilly, South Orange; Isaiah Ball, South Orange; Edward Self, South Orange; N. Martin, South Orange; Howard Stanley, South Orange; Wm. J. Chander, M. D., Health Inspector.

Dug and driven wells supply some water. Public supply by Orange Water Company. Water very good, except in the fall,

when it is low. Reservoir has not been cleaned in four years. Water supply is good, being uncontaminated by sewerage. Three-quarters of the village depend upon wells, the remainder upon cisterns or springs.

Cellars are generally dry. Since the drainage of our swamps or low grounds there has been little or no malaria. There are no public sewers.

Most of the basements are unoccupied and are not used for storing vegetables. We have about twenty-five tenement houses.

There is an ordinance of the village compelling privy wells to be cemented water-tight and emptied frequently.

Have had no prevailing disease, and no diseases of horses, cows or hogs reported.

Slaughter houses are well-looked after.

There are no new manufactories.

Our village contains about three and a-half square miles, and about one hundred and twenty-five dwellings. There are no new physicians or undertakers.

(Signed)

A. A. HANSOM, M. D.

Medical Inspector,

WEST ORANGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Edwin P. Smith, President, Orange; John Otterbein, West Orange; John B. Vanwagener, West Orange; Ephraim I. Jacobus, West Orange; Robert N. Drew, Orange Valley; Lewis Van Buskirk, Assessor, Orange Valley; Dr. B. L. Dodd, Orange.

The water supply is principally from wells and cisterns. There are a few families living on the line of Orange using Orange City water, which is considered very pure and soft.

There is no system of drainage or sewerage. The streets and roads are kept in good condition.

About one-third of the houses have basement kitchens; usually dry.

Mode of lighting has been, up to October 1st, by gas and oil; since then, that portion formerly lighted by gas, is now lighted by electricity.

Those that have cesspools have them cemented.

There is but one slaughter house, and that is kept in good condition.

There has been no unusual sickness during the year.

(Signed)

LEWIS VAN BUSKIRK,
Assessor.

GLOUCESTER COUNTY.

CLAYTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. A. Williamson, Clayton; S. C. Newkirk, Clayton; Thomas McClure, Unionville, Samuel S. Fisher, M. D., Clayton, A. G. Silver, Clayton. H. C. Buckingham, Medical Inspector.

There has been a heavy rainfall during the season. Some cellars have been flooded, but the health of the borough has been unusually good. A few cases of dysentery and five cases of diphtheria, two of which was fatal. The surface drainage is very much improved by the grading of the streets.

No garbage and decaying matter allowed to accumulate in back yards. The privies are very generally cleaned twice a year, and the excreta used by the farmers.

The low, swampy land within the borough is being drained.

(Signed)

H. C. BUCKINGHAM, M. D.,
Medical Inspector.

WEST DEPTFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John C. Budd, P. O., Woodbury; Joseph A. Moore, P. O., Woodbury; Alonzo P. Rambo, P. O., Thoroughfare; Dr. George E. Reading, P. O., Woodbury; Mark Clement, Assessor, Woodbury.

Location on Delaware river, between Mantua and Timber creeks. Climate healthy.

Farmers generally have their winter supply of potatoes in their cellars. No houses have more than two families.

No contagious diseases among cattle.

There is very little to report from our district. Its sanitary condition and health is good. Have had no nuisances reported to the Board.

(Signed)

MARK CLEMENT,
Assessor.

FRANKLIN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel Lowder, Chairman, Newfield; Wm. Tyler, Newfield; Chas. D. Smith, Treasurer, Franklinville; A. A. Smith, M. D., Malaga; Joshua C. Richman, Malaga.

We are purely local, and have no disease of any note, except about eighteen head of cattle went mad from dog-bite.

(Signed)

JOSHUA C. RICHMAN,
Assessor.

GLASSBORO TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Iszard, M. D., Glassboro; W. H. Beckett, Glassboro; F. C. Allen, Glassboro; C. D. Fisher, Glassboro; Howard Iszard, M. D., Glassboro.

Our report for this year is about the same as last, no new enterprises having started. Several dwelling houses have had steam heating appliances put in during the year. Steam has also been put in the public school house.

The health of the town has been better this year than last.

The Board of Health has been unable to do much as we were refused an appropriation at the last township meeting to pay for inspectors.

(Signed)

HOWARD ISZARD,
Secretary.

GREENWICH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Benjamin L. Fish, Gibbstown; Joseph L. Devault, Paulsboro; Robert A. Jester, Paulsboro; Jacob Ballinger, Paulsboro.

The water is furnished from wells from eight to ten feet deep in Paulsboro and most of the township. Surface water and generally soft.

Natural drainage. The water level is close to the bottom of the cellars.

Houses have cellars. Not much used for storage of vegetables.

Houses are built with open side. Not cemented. Cleaned out about once a year.

Slaughter houses are in bad condition.

School houses in good condition.

(Signed)

JACOB BALLINGER,
Assessor.

HARRISON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Christopher Knisell, Mullica Hill, Jonathan G. Foster, Jefferson, Allen S. Clark, Evans Mills, Eli Heritage, Richwood; E. E. DeGroff, M. D., Mullica Hill.

Our water supply is entirely from wells; no discoloration; soft, and no unpleasant taste as far as we have learned.

No sewerage, the village being situated upon a hill, and nature has provided excellent drainage.

Our streets are kept in a clean condition. No public grounds.

All of our houses have cellars, and in many instances, especially among the farmers, the cellars are used for the storage of vegetables. We have no tenement houses that have more than one family in them.

Our cesspools or privies are mostly built over an excavation of two or three feet in depth, with open bottoms, and the excreta is removed by horse and cart and buried in the earth.

There has been several cases of scarlatina, with one exception of a mild form. Also three cases, during the month of September, of malignant diphtheria, one of which proved fatal. The three cases, however, occurred in different families, and although all of the families were quite large, none of the others contracted the disease, due, we believe, to cautionary and sanitary measures employed as soon as the cases were seen. We insisted upon isolating them at

once, and having disinfectants rigidly employed. We are not aware as to whether the assessor inquires as to the contagious diseases of animals.

We believe our slaughter-houses are kept in very fair condition, as we hear of no complaints.

Our school buildings are in excellent sanitary condition, thoroughly ventilated and heated from the basements. With very few exceptions the school children have been successfully vaccinated.

There has been one case of glanders. The horse was promptly killed.

There is no house to house inspection, as we do not deem it necessary, as our people as a rule are well informed as to ventilating and heating.

(Signed)

E. E. DEGROFFT, M. D.,
Secretary.

LOGAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas J. Gaskill, President, Bridgeport; J. Clark Helms, Secretary, Re-paupo; Hance Helms, Bridgeport; John Kirby, Bridgeport; E. T. Oliphant, M. D., Bridgeport. E. T. Oliphant, M. D., Health Inspector.

Water supply entirely from wells; depth from 14 to 25 feet. Some few cisterns, and water used for washing purposes only.

No system of drainage other than drain-tile in low farm lands, and in some few cases ponds are drained into creeks and meadows, and from meadows into creeks and rivers by tide sluices.

Generally dry cellars except in a few instances. Houses generally have cellars, used for storage to a small extent, for potatoes for family consumption.

No sewers.

No animal disease this year.

Slaughter-house about the same as last year.

No manufactures.

No public buildings except school-houses, and they are in a good sanitary condition.

Cemeteries are located half a mile from town, and are on high, dry land, and burials are about four and a-half to five feet deep.

Return of vital statistics are promptly made ; Local Board has had no occasion to quarantine any contagious disease.

Heat for dwellings is principally by stoves in the rooms.

No prevalent disease during the year.

(Signed)

E. T. OLIPHANT, M. D.,
Health Inspector

MANTUA TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

J. Leo Eldridge, Chairman, Mantua; John H. Starp, Jefferson, Charles H. Ferris, Pitman Grove, J. Mason Tomlin, Assessor, Barnsboro. Dr. E. Z. Hille-gass, Mantua, Health Inspector.

Our people depend on wells for their supply of water, which is all that could be desired. It is hard

We have no system of drainage. Cellars are dry as a general rule. We have some few swamps, but malaria is not very frequent. Occasionally we meet with a few cases of intermittent fever.

Our houses generally have cellars, and comparatively few are used for the storage of vegetables. We have no tenement houses of more than two families.

We have no sewerage. Our cesspools are built with open bottom, and the contents are carted away and buried in the soil.

We have had quite a number of families afflicted with typhoid fever, owing, no doubt, to the rainy summer months. The assessor inquires each year as to contagious diseases.

We have one slaughter house, situated in the centre of our town. It is inspected daily during the hot summer months. The stench arising therefrom was at times almost unbearable. We had an unusual amount of trouble with the owner ere the nuisance was abated. It ought to be removed as it will always continue to be a nuisance in summer time as long as it remains at its present location.

We have no trouble with our few manufactories.

The following is an interesting account of some cases of typhoid fever occurring in a family in this township. The drinking water upon analysis was found to contain evidences of contamination of both wells :

William Duffield, aged 20, robust and healthy, occupation a farmer, on August 7th was taken with a chill, headache, slight fever, etc. In a few days his bowels became loose, fever increased, and every symptom indicating that he had a typical case of typhoid fever. He was confined to his bed eight weeks.

Edwin Duffield, aged 17, robust and healthy, occupation a farmer, was taken sick about the same time with every symptom pointing to the same malady. No unfavorable symptoms arising during his length of sickness, which was about six weeks.

Lizzie Duffield, aged 25, rather frail, has been feeling badly for about a week before her brothers were taken ill, finally she was taken with nausea, vomiting slight, fever, ochre-colored stools, in fact all the symptoms indicative of typhoid fever. She had a very serious time all through her sickness. High temperature and violent delirance. Confined to bed seven weeks.

The three above cases used the water from the barn-yard well for drinking purposes in preference to the household.

Mrs. Duffield, aged 53, robust and healthy, the mother of the children was taken with a chill on October 1st, and symptoms pointing strongly to the same malady. She was confined to her bed for six weeks.

Ivy, aged 6, strong and hearty, commenced about the same time that her mother was taken with symptoms of typhoid fever. She was confined to her bed three weeks with no unfavorable symptoms.

Ada Duffield, age 27, rather frail, was taken ill on October 13th, with slight symptoms of typhoid fever; she was confined to her bed about one week. An abortive case, without a doubt.

Charles Duffield, age 11, strong and healthy. On November 17, was taken ill with the same disease. He was confined to his bed six weeks, with no unfavorable symptoms.

George Duffield, aged 15, strong and healthy. On the 27th day of November was stricken with the same disease. No unfavorable symptoms occurring, he is still confined to his bed at the present writing.

So far, the head of the family (Mr. Duffield) has escaped the sickness.

(Signed)

DR. E. Z. HILLEGRASS.
Health Inspector.

MONROE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

J. B. Sickler, Chairman, Williamstown, John W. McClaver, Secretary, Williamstown, H. K. Bugbee, Williamstown; D. S. Champion, Williamstown, J. Gaunt Edwards, M. D., Williamstown

The water supply is obtained from wells and springs. The water is most generally soft and par excellent in quality and quantity. The wells vary in depth from 10 to 25 feet. The strata of soil through them being gravel and coarse sand.

The drainage and sewerage is wholly surface, our town being situated on the water-shed of the Atlantic Ocean and Delaware river water slopes, and is 162 feet above sea level, consequently there are no ponds or creeks in the immediate vicinity of the town.

Nearly all houses have cellars for general storage, which as a rule are situated in a bed of gravel. Many have water in them.

The Board of Health inspect and cause the prompt removal of all refuse and excreta.

A mild form of epizoota occurred among the horses in September and October; but few malignant cases, however, occurred.

There is but one slaughter-house in the town, which is kept in good condition.

There are two school buildings, one of three teachers and a primary of one teacher. A night school is kept open for five months for the accommodation of the factory boys.

There are no fire guards, apparatus, or escapes

There are three cemeteries, and all within the town limits.

The Board of Health adopted the code of laws recommended by the State Board, with such amendments as seemed essential to our township: they were approved Aug. 14th, 1889.

The Board of Health have made frequent visits of general inspection, held several meetings, and taken prompt measures to remove all nuisances, the expense of which will not exceed one hundred dollars.

The heating of buildings is by coal and wood; many have heaters in their cellars. Ventilating is carefully looked after.

There has been no new epidemics, the diarrhoea and dysentery of four years ago has existed each summer, but in a milder form, except in new localities, where it would be of severe form, and some-

times fatal. The prevalent diseases are of malarial origin, and consumption.

(Signed)

JNO. W. McCLAVAR,
Secretary.

SOUTH HARRISON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Horner, Harrisonville; Alfred Lippincott, Harrisonville; Nathan Wilkinson, Harrisonville; Samuel F. Stanger, M. D., Harrisonville; Thomas Borton, Mullica Mill.

Our water supply is derived from wells and cisterns. The water from wells is hard, and during the summer months at times is very offensive and unfit for use.

As to drainage, it is secured by tileage. Without good drainage our cellars would frequently be half full of water.

Most of our houses have cellars, which are largely used for the storage of vegetables.

Cesspools are placed at sufficient distances from wells to prevent likelihood of contaminating the drinking water.

We have had but a very small number of contagious diseases this year. The general health has been good.

(Signed)

SAMUEL F. STANGER. M. D.
Township Physician.

WEST DEPTFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. George Reading, Woodbury; Mark Clement, Woodbury; John C. Budd, Woodbury; Joseph A. Moore, Woodbury; Alonzo P. Rambo, Woodbury.

We have but very little to report from our district. The health and sanitary condition of our district is very good. There has not been any complaint during this term.

This is about all there is, excepting the boundary. West Deptford township is bordered on the north by the Delaware river, West

Mantua creek, east Timber creek, south by W. J. R. R. and Mantua and Woodbury turnpike.

(Signed)

MARK CLEMENT,
Assessor.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Wilkins, Turnerville; Charles Nicholson, Turnerville; Evan Davis, Hurffville; Frank Allen, Hurffville; Dr. C. B. Phillips, Hurffville.

The health of the township during the past year has been excellent. No epidemics and very little malaria or bowel troubles. The sanitary condition of the township is first-class. The Board of Health has had no complaint during the year.

(Signed)

DR. C. B. PHILLIPS, M. D.,
Inspector.

WOODBURY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Thomas P. Smith, Chairman, Woodbury; George K. Carroll, Treasurer, Woodbury; Wallace McGeorge, M. D., Woodbury; Charles Walton, Woodbury; Geo. E. Reading, M. D., Woodbury; Wm. M. Carter, Secretary, Woodbury. Wallace McGeorge, M. D., Health Inspector.

Woodbury is located on Woodbury creek, three miles from the Delaware river, on the West Jersey Railroad, eight miles from Camden. It has a population of about 4,000, and has an even climate. By the Geological Survey, it is given as a red sand bed, and lower marl bed, with laminated sand and clay marls. The upper layer is sand or clay, striking mud or marl at a depth of from 6 to 12 feet. Many of the wells in the city are merely surface water, for the reason that if wells were dug into the marl strata, the water would be bitter or smell offensively in many places. Occasionally a good well of pure water would be obtained, but many more poor supplies would be obtained from well-digging.

To obviate this difficulty, and on account of the contamination of many wells from the multiplying of water-closets, which were so

constructed that all their liquid contents would sink into the soil; and for a better system of fire protection, the inhabitants, at a special election held for that purpose, voted to build a water-works, and the city has now a fair supply of good water, obtained from the head-waters of Mantua creek. The reservoir is on Roe's hill, which is 144 feet above the ocean level, and as levels in Woodbury range from 20 to 72 feet, it is seen that there is considerable pressure, which is utilized in times of fire, and forces the water to the third-story of any house in the city. The number of water-renters is now over 500, but the water-works are not yet self-sustaining. The source from which the water is supplied is above any contamination from sewage, but may at times be somewhat affected by the water running from the marl beds into Mantua creek above our water-basins. About one-half our people still depend on wells. Especially is this true in the rural portions of the city, where the water-mains have not yet been laid. Some people use cisterns, preferring rain water for cooking and drinking purposes. By request from the Board of Health, the fire-plugs at or near the "dead-ends" of the mains are flushed twice a week for the purpose of improving the character of the water where there are only a few takers, and not enough water used to keep the water in circulation.

There is no general system of drainage, but the contour of the ground enables the majority of our citizens to drain effectively, and there are not many wet cellars in the city. There are no swamps near us, nor malaria. Compared with ten or fifteen years ago, there is less intermittent fever, and the city has been, and is now, remarkably free from epidemic diseases. Fifteen years ago, there was a good deal of diphtheria; now, and for years, there is less than one-fourth the amount seen in practice ten or fifteen years ago.

The streets are kept in fair order, and they are lighted by electric lights, and by gas lamps in those sections where the electric circuit is absent. The "arc-light" system is used, and seems to give general satisfaction.

The Board have contemplated a change in the matter of the construction of cesspools and in regulating their cleaning, but have not yet decided what is the best course to adopt. It is evident that some change must be made, as four-fifths of the complaints made to the Board have been of offensive water-closets, and inspection

has demonstrated most of the complaints to be worthy of attention.

Our slaughter-houses are better managed, and but one complaint has been received this year. The public schools are well looked after and fire protection added to all of them. The public buildings are all right, except that the prison has lately had more or less of the odor of an old or unclean jail. The defect in the plumbing has been remedied by the freeholders, and there is an improvement in the condition of the county jail since that time.

By ordinance no new cemeteries or burying-grounds are permitted within the city limits, and the church grave-yards are not allowed to increase their area for burial purposes. There are very few inter-mural interments now.

The Board has not yet adopted any code for their guidance, working under the code formulated by the State Board and general laws. Having shown a disposition to be reasonable in remedying all complaints made to them, and yet displaying sufficient energy to command the respect of their fellow citizens in abating nuisances the Board is pursuing the even tenor of its way.

Council has appropriated \$100 for the use of the Board, but the money was not available for work this summer. For this reason the Board has been cramped in carrying out some needed reforms and correcting some sanitary clauses.

The inspector in making this report would state that he has received much valuable assistance from the secretary of the Board William M. Carter, who by reason of his practical experience as a surveyor has been very useful. All the members of the Board have shown a willingness to act in abating nuisances, and we have been assisted very materially in one or two cases by the advice and labors of our solicitor, Lewis Starr, Esq.

I am happy to close this report by stating that we have no prevailing diseases and that the past year has been a healthy one for the city.

(Signed)

WALLACE McGEORGE, M. D.,
Health Inspector.

WOOLWICH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Moore, President ; Swedesboro, Charles P. Batten, Swedesboro ; Howard

V. Locke, Swedesboro (Township Committee); Samuel Avis, Secretary, Swedesboro (Assessor); Benjamin F. Buzby, Physician of the Board and Health Inspector, Swedesboro.

Generally by wells.

Cellars mostly dry. A portion of Swedesboro requires under-drains for the cellars in very wet seasons.

Streets and roads—gravel, sand and clay.

Very few houses have basements. Nearly all have cellars. A considerable portion of the cellars are used for the storage of sweet and white potatoes, and a few other vegetables. No tenement houses of more than two families.

No diseases of animals worthy of note.

No complaint of slaughter-house.

Manufactories and trades same as heretofore. The glass factory here has been closed for over a year.

The schools are generally well conducted and well attended. The school houses are ample—one new one erected the present year, to replace one that was too small.

Four constables—no prisons.

There seems to be very little guard against fire—a few individuals own fire extinguishers.

There are five cemeteries and burial grounds in Swedesboro.

Code of ordinances of Board of Health adopted and published, as in form given in Chapter LXVIII, penalty \$20 in each case. Any complaints being made to any member of the Board of Health, said complaint is immediately investigated. There have been very few complaints, or causes for complaints, and they have been remedied at once, upon being made known to the persons causing the nuisance.

Dwellings heated chiefly by coal stoves in the rooms. Several dwellings in Swedesboro have heaters in their cellars, by which they heat the rooms.

No epidemic of contagious diseases.

(Signed)

SAMUEL AVIS,
Secretary.

HUDSON COUNTY.

It may not be amiss to briefly refer to some work done during

the period indicated.

Eighteen cases of smallpox were reported, and many of them were removed to hospital. The most stringent measures as to isolation, fumigation and vaccination were taken.

Complaints of obstruction of sewers by reason of breaking down, etc., were frequently received and relief afforded by urging the attention of the proper agents. In some cases the Board made repairs, and paid for them from its own fund.

Complaints were made that swill-men were rendering themselves obnoxious by reason of filthiness of wagons, and the resulting offensive odors. Arrests followed, and an amelioration of the trouble was soon brought about.

Four cases of typhoid fever were reported from 179 Wayne street, Jersey City. On inspection of premises, it was found that the water, etc., pipes were without traps. This matter was rectified.

A sanitary inspection of School No. 6 was made by the Sanitary Engineer of Board, Mr. Frank A. Earle. The drainage was very defective. Certain improvements were suggested and urged upon the Board of Education. Following this, a general examination of the school took place, and some necessary changes indicated.

A large amount of dumping of foul-smelling garbage on sunken lots, notably by the Lehigh Valley Railroad and West Shore Railroad, or rather upon their property, was brought to a termination; the railroad officials, in most cases, promptly acceding to the requests of the Board.

A general inspection of sunken lots covered with stagnant water was ordered, and notice sent to owners to abate the nuisance. Suits were instituted, and much improvement was brought about.

The assistance of the Board was frequently asked by local health officers and always given.

The large accumulation of horse manure on the west bank of the Hackensack river, owned by the New York Horse Manure Company was complained of and carefully inspected by the Inspector and President.

This manure pile was about 900 feet long by 35 feet wide, and averaged about 15 feet in height. After many interviews and consultations with the representatives of the company, the Board finally took chancery proceedings to secure the removal of this manure. The case is now pending.

Certain cow stables, of which it was rumored that the cows were unhealthy were examined, and many improvements were made and and one owner compelled to remove from the county. At least, the action of the Board resulted in the removal of his dairy.

By the order of President Gordon, of this Board, several inspections of diseased cattle at abattoir were made, and a number found to be affected with Actino-mycosis or "*lump-jaw*," were killed, and the carcasses rendered unfit for food by reason of injection with carbolic acid solution.

It was found that scavengers were in the habit of dumping night-soil on unfrequented streets in various parts of the county. Evidence being obtained against certain parties, this evil was to a large extent stopped.

A case of typhus fever was found in the town of Union. It was isolated and premises fumigated. No other cases were reported.

The Board has directed its efforts toward improving the plumbing of buildings, and with considerable success.

(Signed)

C. J. ROONEY, JR.,
Clerk.

HUNTERDON COUNTY.

ALEXANDRIA TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David Phillips, Chairman, Little Rock; Jonathan Kugler, Frenchtown; George W. Weller, Mount Pleasant; M. D. Knight, Township M. D., Little York; Jos. P. Stout, Assessor, Everettstown. M. D. Knight, Health Inspector.

The Health Inspector reports the health of the township good for the last year, with no contagious diseases. This is about all there is to report as far as I know.

JOSEPH P. STOUT,
Assessor.

BETHLEHEM TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

T. I. Hoffman, Bloomsbury; David Alpaugh, Norton; Joseph Mayberry, Junction; Dr. J. S. Lindabury, Bloomsburg; John E. Dalrymple, Pattenburg

The water supply is from springs, wells and cisterns; as to the exact number I am not able to tell.

As to drainage it is very good, and the water level is so that the cellars are usually dry.

The houses generally have cellars, which are largely used for storing vegetables. Do not know of but two houses that are occupied by more than two families.

There have been no contagious diseases during the last year.

The general health of the people has been very good for the last year.

As there are no towns of any size in our township, I don't know of anything more to report to you; as it is, things are kept in pretty good shape generally, to the best of my knowledge.

(Signed)

J. C. DALRYMPLE,
Assessor.

CLINTON TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

N. W. Hoffman, Lebanon; John H. Knox, Lebanon; Peter Rockefeller, Lebanon; Jacob S. Hulzizer, Annandale; W. E. Berslaw, M. D., Annandale. No Health Inspector.

Water supply—mostly wells, cisterns and springs; generally very good.

Mostly natural drainage.

Refuse and excreta mostly used to fertilize soil and excreta are usually left in cesspools.

There are two or three slaughter houses in the township. The Board, upon complaint, inspected one in Annandale, and directed that it be thoroughly cleansed and disinfected; that no large animals be slaughtered there, and the refuse from smaller animals be removed and buried. The order of the Board was obeyed, the nuisance abated, and no further complaints received. No complaints received as to other slaughter houses.

All schools and school buildings are now in first class condition, a new school house having been built in Annandale.

Cemeteries are in good condition.

Physicians and ministers report their cases occasionally, and no fault to be found.

Owing to the absence of any "small-pox scare" for several years, the people are somewhat negligent as to vaccination of their children. No contagious diseases have been in existence during the past year.

Dwellings are heated mostly by stoves, but new dwellings and some old ones are now heated by hot air furnaces.

This Board respectfully submits this report.

(Signed)

W. E. BRESLAW,
Chairman.

DELAWARE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jos. C. Reading, Secretary; Sergeantsville; Jas. Servis, Sergeantsville; Calvin Strimple, Stockton; Nelson Lambert, Sergeantsville; I. S. Cramer, M. D., Sergeantsville.

Our township Poor-house is kept in good condition.

The cemeteries are all kept in proper order.

The past year has been healthy, and we are glad to be able to report that it has been remarkably free from epidemics of any kind.

We are without any system of drainage in the township.

The supply of water in this township is mostly springs and wells.

(Signed)

Jos. C. READING,
Secretary.

EAST AMWELL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph Van Marter, Reaville; Ira Higgins, Westville; Theodore Craft, Westville; Van Horn Locy, Ringgold; P. C. Young, M. D., Ringgold, Health Inspector.

East Amwell Township occupies a southern position in Hunterdon county, bounded on the south and east by Mercer and Somerset counties, on the west by Delaware township, and on the north by Raritan township. It has a population of about 2,000.

The surface of the township is agreeably diversified with valleys and hills, which give it natural drainage. All our streams empty into the Raritan river. The Sourland Mountain Range extend along the southeastern border of the township.

The Amwell Valley constitutes one of the richest and most fertile agricultural valleys in the county of Hunterdon.

Ringoes—its largest and most important village, has a population of about 350, and about 60 houses, generally frames. The cellars mostly all have a lime and sand floor, and are used for storage of vegetables.

Our water supply is from wells and cisterns.

We have several slaughter-houses in the township, and all refuse arising from such is admirably managed by the proprietors so as not to be a nuisance to neighbors. I have never had any complaint in this particular.

We have four public schools, all in good condition. One poor-house in the township, which is always kept in good sanitary condition.

No disease can be said to have existed as an epidemic, though the past year has been a busy one for the physician.

Scarlet fever, whooping cough, erysipilous, cancer, diarrhœa, cholera morbus and diptheria have prevailed more or less. Very little malaria for the past year or two. I cannot record a heavy mortality for the past year,

(Signed)

P. C. YOUNG, M. D.

Health Inspector.

FRANKLIN TOWNSHIP.

I have no report to make. The Township Committee have never organized, although I have often called their attention to so doing. The health of this township is excellent, only one case of fever during the past year to my knowlege. General health good all over the township.

(Signed)

E. C. TRIMMER,

Assessor.

FRENCHTOWN.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

O. B. Kugler, Secretary, Frenchtown; J. C. Hawk, Frenchtown; S. B. Lyons, Frenchtown; H. I. Srope, Frenchtown; A. B. Nash, M. D., President.

Located on Delaware river; population, 1,200.

Water supplied by wells, cisterns, Delaware river and creek.

No drainage except by street.

Mode of lighting—coal oil lamps.

Refuse and excreta carted away.

Two meat markets.

Two slaughter-houses.

Four wood-working establishments.

Four churches, one town hall, two schools.

Police station in town hall.

Only one fire-escape—A. P. William's building.

One cemetery.

Dwellings are heated by stoves and heaters.

(Signed)

O. R. KUGLER,
Secretary.

HIGH BRIDGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. C. Alpaugh, M. D., High Bridge; John K. Apgar, High Bridge; Owen Aller, High Bridge; George M. Rinehart, Cokesbury; Stephen Apgar, Cokesbury.

Refuse carted away; some thrown in the streets.

We have no regular markets.

All slaughter-houses are out of town.

We try to carry out health regulations.

A few cases of dysentery and scarlet fever have occurred. Bronchitis has prevailed during the year.

KINGWOOD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George W. Kugler, Tumbel; Wm. G. Baggs, Kingswood; Augustus Fields, Baptisttown; George E. Dalrymple, Assessor, Baptisttown; E. D. Leidy, M. D., Baptisttown. E. D. Leidy, Health Inspector.

I have nothing to report for the past year. The health of the township has been unusually good; no nuisance complained of. We have only one physician in the township, and no undertaker.

(Signed)

GEORGE E. DALRYMPLE,
Secretary

LAMBERTVILLE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Gervas Ely, President, Lambertville; W. H. Wilmot, Clerk, Lambertville. Wm. Lyman, Lambertville; J. L. Coryell, Lambertville. Dr. G. H. Larison, Lambertville, Robert H. Ditts, Health Inspector.

Along the Delaware river. Population about 5,000. Climate healthy. Acres, about 700.

Long and narrow.

City water supply; analysis shows it to be free from contamination. Water-works owned by private company.

No sewers; surface drainage; cellars dry.

Streets are partly macadamized and part dirt.

Houses all have cellars; very few basements; where basements exist, they are used as kitchens.

Gas and oil; electric light soon coming.

Cesspools with open bottoms, and emptied by the party in charge of the Board of Health.

No cesspools permitted in the built-up part of the town, and all kept clean by inspection.

Steam saw mills, paper mills, spoke works, flour mills, etc. Nothing to cause injury to health.

Three public schools in good sanitary condition; one or two private schools.

City jail cleaned frequently, and inspected by the inspector.

Four cemeteries—one old and not used.

City Clerk records the births, deaths and marriages.

Scarlet fever and scarlatina have prevailed.

LEBANON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Jacob Hipp, Glen Gardner; Joseph Fritts, Glen Gardner; Andrew C. Cregar, Califou; A. S. Banghart, Secretary, Glen Gardner.

Lebanon township is situated in the northern part of Hunterdon county with a population of about 2,800 inhabitants. Our climate is very changeable, especially in the spring and fall. Our soil is of that nature peculiar to limestone, and the contour of the county is mountainous. Our water supply is mostly by springs, and as a general rule, is excellent in quality. Drainage is natural. Kerosene is used as our light. Excreta is very often left to decompose on our vacant lots. There has not been any disease among animals with the exception of cholera among hogs. Our butchers are especially careful as to the refuse and the slaughter houses are kept clean.

Our school houses are in good repair and are as well built and ventilated as any in the State. The past year has been very unhealthy; a great deal of sickness and many deaths from natural causes. No epidemics have been with us this year except some cases of diptheria in Glen Gardner. Our health board has not done anything this year. I think our township should have an Inspection made, then if the committee refuse to act the Assessor and Inspector could look after the health of the township to some extent. We have not had any Inspector since Dr. Thomas Cary went away.

(Signed)

A. S. BANGHART,
Secretary.

RARITAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Myles Cunningham, Flemington; Wm. L. Thatcher, Flemington; George W. Fulper, Flemington; Andrew J. Green, Flemington; John H. Ewing, President, Flemington.

There is nothing new to report. Questions have been answered fully.

We have had no epidemic during the year, and are able to report that the general health is rather better than usual.

(Signed)

ANDREW J. GREEN,
Secretary

REPORT OF THE BOARD OF HEALTH.

READINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Fisher Pidcock, White House Station, P. S. Latourette, Pleasant Run, James Lane, Readington, W. W. Pursell, M. D., White House Station, D. T. Stryker, White House Station.

TEWKSBURY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. T. Miller, Califou, Manning L. McCrea, New Germantown, Harmon L. Sutton, Califou; Nathan L. Tigew, Mountainville, David C. Farley, Mountainville; Wm. J. Moore, New Germantown.

The health of Tewksbury township has been very good for the past year. No epidemics have prevailed. Malaria quite prevalent, as might be surmised from countour of country.

Our supply of water for cooking and drinking purposes is mostly from springs and wells, and is generally of a good quality.

Most of the houses in the township have cellars, and are used for the storage of fruits and vegetables.

Refuse is generally buried or fed to pigs, so that there is no accumulation from this source. At Califou, a good deal of fault has been found on account of the collecting of decomposed beer grains around depot, rendering the air foul. This has been referred to the proper authorities, but no action has yet been taken.

There have been no diseases among cattle or animals the past year.

Local Health Board passed health ordinance last spring; Health Board is in good working order.

Vaccination is very much neglected.

Our public schools are well ventilated, and as good as any in the State.

Drainage and sewage is generally fair.

(Signed)

DR. T. MILLER,
Health Inspector.

UNION TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph H. Exton, High Bridge; Isaac B. Case, Pattenburg; A. B. Bollean, M.

D., Jutland; E. R. Robinson, Jutland, Chairman; Morris Stockton, Pattenburg, Secretary and Assessor.

Located in the northwestern part of New Jersey. Population about 1,250. Climate is temperate.

No epidemic or diseases of animals in the township during the year.

One slaughter house.

One peach basket factory.

The principal business is farming.

Six schools and six school houses. No other public buildings.

Four cemeteries and four burials.

Public health laws and regulations are well enforced.

The township physician states that the health in the township at present was never better. No contagious diseases of any kind. Our board is well organized, and our last meeting was October 12th. Up to that date there has not been anything before the board for consideration. The season has been an unusual wet and cold one.

(Signed)

MORRIS STOCKTON,
Secretary.

WEST AMWELL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John B. Drake, Pres., Lambertville; Lemuel Phillips, Clerk, Lambertville; Edward M. Larew, Rocktown; Joseph K. Lee, Lambertville; George H. Larison, M. D., Lambertville.

No hog cholera this year.

Vital statistics are looked after by physicians.

Nothing of much note. A little scarlet fever.

The rains in excess does not or has not done any serious damage to the general health.

There has been a better degree of average health than for many years past.

(Signed)

GEORGE H. LARISON,
Physician.

REPORT OF THE BOARD OF HEALTH.

MERCER COUNTY.

EAST WINDSOR TOWNSHIP.

MEMBERS AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. Cunningham, Hightstown, Levi Updike, Hightstown, John Whittick, Hightstown; W. D. Wear, Assessor, Hightstown.

The borough of Hightstown has a Board of Health with a health inspector.

W. D. WEAR,
Assessor

HAMILTON TOWNSHIP.

MEMBERS AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. George R. Robbins, Hamilton Square; Amos Cole, Yardville; John Kirby, Yardville, Joshua Lee, Trenton; Wm. A. Blake, Allentown, New Jersey.

The water supply of Hamilton township is from wells and springs.

The drainage is by underdraining. We have a number of small swamps, but very little malaria.

Our streets are such as are common to country towns. We have no public grounds.

Houses are tenanted by a respectable and comfortably situated class of people.

Such as are usually used in the country.

Only such as are common to animals.

Schools are well kept and in good order.

Almshouse is very nicely kept.

Cemeteries are very nicely kept.

Public health laws are well enforced.

Statistics are well reported.

Children are well vaccinated

Health expenses are paid by the township.

Heating by wood and coal.

Only such diseases have prevailed as are common to all communities.

(Signed)

WM. A. BLAKE,
Secretary of Board of Health.

HIGHTSTOWN.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Thomas Mason, President, Hightstown; Thomas C. Pearce, Secretary, Hightstown; F. D. Budlong, Hightstown; George Y. Wood, Hightstown; Charles Manlove, Hightstown. Thomas C. Pearce, Health Inspector, Hightstown.

Water is mostly supplied by wells. Many have been examined by our medical physician. Some wells have been filled up on account of bad water.

Most cellars are drained to a creek running through the centre of the town. We have no sewerage system.

The sewers and cesspools are generally cleaned out twice a year. Usually built with open bottoms.

No diseases of animals, except a few cases of glanders being condemned and killed by order of the Board of Health. No disease among the cows and hogs.

Slaughter houses are kept in clean condition and closely watched by the inspector. It is now a matter before the board whether they shall not be removed from the city limits.

One public school and Peddie Institute and Home Seminary are in a good sanitary and healthful condition.

Regular Board of Health, regular meetings, and watching closely the sanitary condition of the city.

The people have been thoroughly vaccinated.

Sanitary expenses are about \$150.00.

THOMAS C. PEARCE,
Medical Inspector.

HOPEWELL TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

S. A. Weart, Hopewell; Wesley Case, Lambertville; Jas. R. Bergen, Pennington; E. L. Welling, M. D., Pennington; Wm. D. Hill, Hopewell.

LAWRENCE TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Jacob R. Wickoff, Dutch Neck; William J. Tindall, Edinburgh; Dr. Franklin, Hightstown; S. Judson Allen, Assessor, Lawrence Station.

PRINCETON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. J. H. Wykoff, President, Princeton ; Dr. E. H. Bergen, Princeton ; H. B. Cornwall, Princeton ; A. L. Rowland, Treasurer, Princeton ; John Vandeventer, Princeton ; Geo. W. Brewer, Secretary, Princeton. Jas. K. Brown, Health Inspector.

Population 3,000.

Water company private company. About one-third of the houses have supply from the company, rest use wells. Water is soft, pipes are cleaned.

No drainage except natural.

Houses generally have cellars.

No sewers except on college and seminary grounds mostly all cesspools are cemented.

Last spring several cases of cerebro spinal meningitis among horses but none at present time.

The town is mostly lit by gas. But the Pine Electric Company have introduced their lights in all the stores.

Slaughter houses are all out of Borough limits.

There is no manufacturing company in the place.

They are at present in the borough (five) 5 schools private and public, outside of the regular college and seminary.

The town has one regular Marshal, assistants are sworn in on special occasions, and contains one jail.

College buildings are the only ones having fire escapes.

There are three (3) cemeteries in the borough.

Under control of Board of Health.

Vital statistics reported monthly.

All college buildings heated by steam, most of the private dwellings by furnaces, while dormitories of seminaries are heated by stoves in each room.

The streets are being macademized in part each year, which is paid for by an appropriation of the Council.

There has been no disease prevalent for the past year.

(Signed)

GEO. W. BREWER,
Secretary Board of Health.

PRINCETON TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Henry B. Bayles, Princeton; Henry E. Hale, Princeton; Edward G. Warren, Princeton; Dr. E. H. Bergen, Princeton; Jesse Suook, Princeton.

The Board has had regular meetings.

Only one complaint was made during the year; that was investigated and remedied. The Board also gave notice to the road overseer to prohibit any one from throwing refuse of any kind on the highways.

TRENTON CITY.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

G. D. W. Vroom, President; Thomas S. Chambers, Treasurer; William Cloke, Secretary; Dr. Cornelius Shepherd; William Hewitt; Carroll Robbins; Albert Clayton; James H. McGuire, Health Inspector; James H. Tindall, Assistant Inspector.

The water department is in fair condition; the source of supply is abundant and the quality fair. We have ample pumping facilities and when the new ascending main is completed, will be able, with our combine pumping power, to deliver into the reservoir, ten million gallons of water in twenty-four hours, which will far exceed the demand for years to come, at the present proportionate increase.

We have now sixty-six miles of water pipe, from four to thirty-six inches, and eleven thousand buildings that use city water.

Continual complaints are coming to this office of the bad condition of the wells of water in the city, used for domestic purposes.

The water from the different wells has been analyzed and has been found to contain large proportions of organic matter.

Kitchen waste and laundry sewage, sewer principally into cess-pools, although sewers are being rapidly constructed, some have been finished and are waiting to be accepted by the city. We have a mile of Petty Run water drain, and two and one-third miles of sewerage pipe laid. The drainage from the annexed districts of Chambersburg is very bad; there being no sewers, and no system of sewerage, and the land is very level.

T OF THE BOARD OF HEALTH.

In the eastern part of the city is very wet, the soil is of clay, and cellars and yards are kept in a wet condition, but so until the sewage system is adopted throughout the

streets are in a fairly good condition, the same being kept in good sanitary condition by the street commissioner. Some of the streets are paved with granite blocks. We have a new park in the eastern part of the city which is a credit to our city. It is kept in good order by the Superintendent. We have a public square in the north ward, which has been improved, and is now in a good condition.

The houses in the annexed district of Chambersburg are mostly of the same kind as in Trenton proper they are principally brick houses. We have very few tenement houses, and two families are the average in these tenements, except where the Italian and Hungarian immigrants reside.

The city is lighted by gas and electricity. The streets near the city limits are lighted by gasoline lamps, which afford a very dim

The garbage, refuse vegetable matter, etc., are put in boxes, barrels, etc., and are placed on the sidewalk in front of the premises, and then hauled away by garbage collectors, who are paid by the city. Common council awards the contract for collecting the garbage to the lowest bidder. Mr. John Hess holds the contract for the present year. Excreta is taken from privies and hauled away to the proper dumps outside of the city limits, by licensed excavators. We have seven licensed excavators, who pay a yearly license of twenty dollars each.

We have two public market-houses, both are kept in a good, clean and healthy sanitary condition. They are visited regularly by the inspector or his assistant.

There are fifteen slaughter houses in the city. They are kept in a fairly good condition, they are visited regularly by the inspectors and the proprietors are frequently cautioned, in regard to keeping their places in good sanitary condition.

We have twenty public-school buildings in the city, the cellars and grounds are kept in a good clean condition by the janitors. The modes of ventilation are very poor and totally inadequate, owing to the crowded condition of the schools. Especially can this

be said of the Centre street school. The condition of the assembly room of this school calls imperatively for prompt action. No light or air reaches this room, except that which passes through halls or class-rooms. Resort is had to artificial light during much of the time, which is necessarily injurious to the eyesight of the children in attendance.

The city almshouse, situated on Princeton avenue, is a large, commodious brick building standing back about one hundred feet off the street. The present steward is Mr. Louis F. Baker. There are thirty-five male and sixteen female inmates in this institution at present, but when cold weather sets in the number will be increased. The drainage from this place is very bad, the building inside is in good sanitary condition, the walls of each room are as white as lime can make them, and the rooms are well ventilated. The one great fault of this institution is there is no bath room for the inmates. This is a matter which the managers should think seriously over. We have two hospitals, the Homœopathic and St. Francis, both are kept in good sanitary condition.

The State Deaf and Dumb Institute has perfect sanitary arrangement.

The State prison has at present 977 inmates, and only seven hundred cells. The sanitary arrangements, in and around this institution are as good as can be, under the present circumstances. The present keeper is John H. Patterson.

The county jail has at present forty-eight male and three female inmates, the cells are clean, with one exception; from this cell an offensive odor is emitted, which seems to emanate from an old cess-pool. This should be remedied immediately. The warden is Mr. John G. Murheid, his assistant is Mr. Thomas Price.

The Central Police Station is kept in a good and clean condition, but is suffering greatly for the want of proper sewerage, which will be remedied in the near future. The second precinct has not the advantages which the Central has.

The Mt. Zion African cemetery, the Cathedral cemetery, and Mercer cemetery are kept in a poor condition. The others are kept in a very good condition.

The vital statistics are kept by the city clerk. The undertakers have been dilatory in filing their burial certificates. But since one of their number has been prosecuted and the penalty imposed by the court,

they have been more prompt in filing the same. The undertakers, in defence of themselves, claim that the physicians do not make their returns as they should, thus hindering them. The undertaker was prosecuted upon two charges for the violation of section 36 of the Sanitary Code. The fine imposed was \$50 00 and costs.

We have a small-pox hospital, situate near Greenwood cemetery. This building is in a very dilapidated condition, and at a very little expense could be put in good shape.

The expenses for the fiscal year were \$2,025.54.

The prevalent disease of the year has been diptheria, of which there has been twenty two cases ; scarlet fever, nine cases, and typhoid, eight cases.

We have been engaged during the past year in making house to house inspections, but have been unable to do the work as it should be done, as we have only such small force, myself and my assistant. We have made one thousand three hundred and sixty-two house inspections during the past year. Have served seven hundred and eighty seven notices by mail. Have received ten hundred and ninety-four complaints at this office.

There are at least 8,000 cesspools in the city.

Have issued ten hundred and sixty scavenger permits, have received the sum of one hundred and forty-five dollars for scavenger licenses, which I have paid into the city treasurer's hands.

(Signed)

JAMES H. MCGUIRE,
Health Inspector.

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During the year I have collected six hundred and sixty-one samples of food, including ninety-five samples of milk in the city. These were sent to the chemists employed by the Dairy and Food Commissioners of the State. When the results of the analysis in each case was known the dealer in the article tested was notified concerning these results, and if the article in question was adulterated or below the legal standard the dealer was further notified that the continued sale of the adulterated food would be followed by immediate prosecution. By rigidly following this plan of action I have been enabled to free the city of Trenton from nearly all adulterated or debased articles of food, and I may say,

without fear of contradiction, that no city in this State is so well protected against the evils of impure articles of food. As a proof of this statement I may mention the fact that samples taken recently were in nearly all cases pure and up to standard.

Of the 95 samples of milk examined only 9 were below the standard, a condition of things that may well cause our citizens to congratulate themselves on the purity of their supply of milk. Below I give some of the results of the inspection of our milk supply.

Number of samples tested 95 ; 45 samples contained 12 per cent. of solids and not one over 13 per cent.; 34 samples contained 13 per cent. of solids and not over 14 per cent.; 6 samples contained 14 per cent., of solids and not over 15 per cent.; 1 sample contained over 15 per cent. of solids ; 9 samples below the standard.

Have received seventy-five dollars in penalties, from persons selling unwholesome meat, which has been paid to the treasurer of the Board of Health.

(Signed)

JAMES MCGUIRE,
Inspector.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Coleman, Chairman, Windsor; Forman Hutchinson, Windsor; Harrison Yard, Robbinsville; Dr. Geo. H. Franklin, Hightstown; John B. Yard, Secretary.

We have no report to make this year, as we have had no complaints of any consequence.

(Signed)

JOHN B. YARD,
Secretary.

MIDDLESEX COUNTY.

CRANBURY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alex. S. Stults, Cranbury; David Farr, Cranbury; Alex. Mason, Cranbury; S. J. Chamberlin, Assessor, Cranbury; Henry C. Symmes, M. D., Health Inspector.

250 **REPORT OF THE BOARD OF HEALTH.**

Located fourteen miles from New Brunswick, the county seat.
Population, 1,800.

Depend mainly on mills. The water, as a rule, good.

The slaughter-houses are in the country, some distance from the town.

Five district schools. One private school.

One institution, the Garrison Home, for feeble-minded.

The cemeteries are all well kept, the laws pertaining to the burial of the dead being well attended to.

There has been a good deal of sickness throughout the township during the past year. The prevailing diseases arising from malarial causes.

(Signed)

HENRY C. SYMMES, M. D.,
Health Officer.

EAST BRUNSWICK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John O. Cozzens, Chairman, Spottswood; Conrad Kohlhepp, Milltown; John H. Perdun, Milltown; Benjamin Peterson, Assessor, South River; John C. Thompson, M. D., South River; S. M. Disbrow, M. D., South River.

The town of Washington, which is included in the limits of the township of East Brunswick, appointed a Board of Health through its Board of Commissioners, viz: Charles Whitehead, Alfred Stutts, Abraham C. Price, James Bissett and John J. Bissett, M. D., P. O. address, South River, N. J., in May last. They have not organized as a Board of Health at the present time.

There is nothing further to report, more than is set forth in the report made a year ago.

(Signed)

BENJAMIN PETERSON,
Assessor.

SAYREVILLE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John S. Heston, President, Sayreville; M. S. Higbee, Sayreville; M. Salmon, Sayreville; J. H. Blackman, Physician, Sayreville; Eugene A. Wagner, Secretary, Sayreville. A. L. Rue, Health Inspector.

At the last meeting of the Boarth of Health of the township of Sayreville held before this the members of the Board resolved that the secretary of the Board notify the New Jersey State Board of Health that there is no contagious or infectious disease in this township, and that the township is in a healthy condition as usual.

EUGENE A. WAGNER,
Secretary of the Board of Health.

MADISON TOWNSHIP.

Climate generally healthful and being near the ocean the air abounds with humidity. We have an abundant supply of water from wells and springs.

No sewers and surface drainage.

Houses generally have basements and cellars, in the country cellars are used for the storage of vegetables.

No prevalent diseases.

Seven public schools all in good condition.

The poor of this township are boarded at different houses.

No lockup.

Two burial grounds in fair condition.

Dwellings heated by stoves and furnaces.

Ventilation as in all country places.

The most prevalent disease has been Diarrhœa and Malaria.

No regular slaughter houses.

No factories.

Lighting is by kerosene lamps.

Madison township has as yet never organized a Board of Health.

(Signed)

C. H. WARNE,
Assessor.

MONROE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. Redmond, Jamesburg; Richard Lewis, Jamesburg; Samuel Butcher, Hightstown; Dr. J. R. Suydam, M. D., Jamesburg; Chas. Edwards, Clerk of Board, Prospect Plains; Chas. G. Hoffman, Assessor.

The health of both township and borough of Jamesburg is in good condition. No epidemic up to date and no disease among the cattle in township as far as I can learn. The Reform School is in our township, and it is well looked after by Superintendent Otterson and officers of the institution. Mr. Elliott, the farmer, has everything removed as soon as possible. Receive our water throughout the township from wells. The houses and farms are in a comfortable condition.

(Signed)

CHAS. G. HOFFMAN,
Assessor.

NEW BRUNSWICK.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Henry R. Baldwin, M. D., President; Chas. H. Voorhees, M. D.; Peter T. Austen, Ph. D.; H. B. Willis, Treasurer; H. B. Cook, City Clerk; P. A. Shannon, City Physician; A. Van Nest Baldwin, Health Inspector.

Located on the west bank of the Raritan river, at the head of tide-water navigation.

Population is estimated at 22,700.

Climate is generally healthy.

During the year the temperature has been unusually low, and the rainfall excessive, being about 10 inches above the average (average rainfall per annum, 37 inches. From January 1, 1889 to November 1, 1889, 47 inches).

Geological formation, principally red shale, with, in some locations, a deep layer of sand and gravel.

The area of the city and township is 2,875 acres.

In contour the city presents a perfect water-shed, with a gradual elevation from high water mark to an average altitude of 90 feet toward the west.

The city is traversed from west to east by four water courses, the most northerly one finds its outlet through an aqueduct, into the river. The two central ones empty into the canal. The fourth, and most southerly also empties into the canal. Three brooks and their tributaries drain a large area and are very gradually being converted into aqueducts.

The quality of the water has been about the same as usual.

During the heated summer months the water runs high in organic matter, and if allowed to remain too long in the reservoirs, becomes almost unfit for use. The organic matter is almost entirely of vegetable origin. The introduction of a practical filtering process would greatly improve the character of the water. The wells are as a rule, in bad condition. One well in particular, appears to have been the source of a large number of cases of typhoid fever.

The portion of the city which is sewered requires no particular attention, for the system is in as good working order as such a system can be. This Board of Health has condemned said system in former reports, and still does so. The traps and plumbing in many houses are in bad condition. Nothing but a careful house to house inspection, and the enforcement of strict laws regulating the plumbing, will avail to obtain a sanitary control of these matters. The unsewered portion of the city contains a very large number of privies and cesspools, of which inspection shows the majority in bad condition. Owing to the uncertainty about the ownership of some of the property, caused by trouble in the collection of taxes, systematic inspection and enforcement of laws has hitherto been impossible. Those districts which have been covered by the Commissioners of Adjustment are now being inspected, and orders to clean are issued in each instance where the privy is found to be full or in bad condition.

A disease has been prevalent among cattle which has proved fatal in many cases. The symptoms are high febrile action, rose-colored eruption on teats, nose and legs, in some cases sores and abscesses being found over the whole body, accompanied by intense irritation, and always by marked constipation. By some, the disease has been attributed to a strange fly, which has made its appearance this summer, but as the disease has prevailed where this fly has not been found, and in many places where flies were found no cases of this disease occurred, it is not likely that they were the exciting cause. Prof. Smith, entomologist, at the State Experimental Station, says the flies are not the cause of the disease.

We have a code of Health ordinances regulating the sanitary condition of the city, consisting of the following :

Defining nuisances and providing for their abatement.

Regulating contagious diseases.

Pertaining to diseases of animals.

In regard to privy wells and cesspools.

Pertaining to the removal of offal, vegetable matter, material removed from sewers and sewer basins, slops and liquid house-waste, and house to-house visitation.

Defining the duties and powers of inspection of the Board.

There has been an improvement during the past year in the reports from physicians, of births and deaths, but there is still one physician in the city who has never as yet made a birth return.

The Board takes pleasure in reporting the fact that physicians are notifying this Board of cases of contagious diseases which occur in their practice with more regularity, thus enabling a more perfect tabulation of these diseases, and also in preventing children from attending school, who reside where the disease exists, and further, in the prevention of public funerals in such cases. The Board has done considerable work during the year in the enforcement of private funerals in cases of contagious diseases, being obliged in one or two instances to call in the aid of the police. We are now provided with two record books for the tabulation of said diseases, one in which the cases are recorded as soon as reported. The other is for the yearly summary of the cases.

We hope in this way to be able to compare the reports of each year as to the number of cases, and particularly the location in which certain diseases occur, and by the use of disinfectants, stricter quarantine, and removal of cause to diminish their prevalence.

At the last charter election the Board was voted the sum of one thousand dollars for its expenses, which has been found adequate.

The health of the city throughout the year has been generally good. Diphtheria has been the most prevalent disease, although the number of cases has been small in comparison to the size of the city, only 97 cases having occurred, which is less than 5 per 1,000. Scarlet fever has been mild in type and the number of cases small; 40 cases only reported, which is less than 2 per 1,000. In typhoid fever, the statistics have been more gratifying; 21 cases reported, being a trifle over 1 per 1,000. In connection with typhoid fever, the Board has taken considerable pains in all cases to ascertain, where possible, the water supply, and we are pleased to report that in no instance was the disease traceable to the public water-supply, but to water obtained from public or private wells, and pumps throughout the city. Is not this fact suggestive of the necessity of

condemning all pumps and wells, either public or private, within the thickly-settled districts, knowing as we do that it is impossible in such districts to prevent the contamination of such sources of water supply.

The disinfection of the streets, gutters, etc., has been carried on steadily during the spring, summer and fall, the disinfectant used being a solution of Bromine in water, 1 lb. to 200 gallons. Our experience with this is most satisfactory, for it far surpasses in efficiency any others that we have tried. Printed complaint blanks are supplied to all drug stores, which are filled up and mailed to the Inspector by the complainant, the name of the latter being held confidential by the Board. Complaints are entered in a record book.

A. VAN NESS BALDWIN,
Health Inspector.

NORTH BRUNSWICK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles M. Snediker, Assessor, Milltown; Dr. F. E. Riva, Milltown; Phillip Kuhlthan, Milltown; John N. Bodine, Franklyn Park; James Schurman, New Brunswick.

Bounded on the north by New Brunswick; northwest by Franklyn Park and Somerset county; on the southwest by South Brunswick township; on the southeast by Lawrence's brook.

Population has increased since last census.

The township has sandy loam, shale ground, copper mines, blue stone quarries and clay.

Water supply is by wells and cisterns. As this is mostly a farming community there is no system of drainage.

Township has no public grounds.

Houses are generally frame and occupied by their owners. The cellars on the farms are generally used for dairy purposes and storage of vegetables.

Gasoline and kerosene oil are used for lighting purposes.

No diseases of animals since last report.

There are several slaughter houses. They are in bad condition and the owners have been notified to remedy the evil.

In the borough of Milltown there is an india-rubber factory, where they manufacture rubber shoes and boots.

The borough commission was formed and incorporated last spring. It contains about 400 acres, and situated within the limits of the township. The dwellings are mostly owned by the employees. The population of the borough is about 900 inhabitants. A Board of Health has been organized in the borough, Clarkson P Stelle, secretary. Address Milltown, N. J. The borough has street lamps.

There are three public school houses in the township and in good condition.

The poor farm of the city of New Brunswick is located in the township of North Brunswick.

The borough commission has two marshals.

The Myer Rubber Company has a thorough fire extinguisher.

There are eight cemeteries located in the township.

The borough commission of Milltown has distributed ordinances regarding health laws and their enforcement.

The assessor forwards the reports at the proper time.

Vaccination is duly attended to.

Dwellings are heated by stoves and heaters.

Scarlet fever, hooping-cough and measles have prevailed.

The Myer rubber factory employes about 500 men, mostly Germans and Poles.

(Signed)

C. M. SNEDIKER,
Assessor.

PISCATAWAY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Town Committee, Warren Smalley, New Brunswick; Firman R. Walker, New Market; Abaah Gray, Dunellen. A. S. Coriell, Assessor, New Market; W. J. Nelson, M. D., New Market.

Our board met last spring as usual and organized with the above members. We have had no other meeting and have nothing new to report except less sickness than usual. No epidemics except at present a disease among cattle in our neighborhood.

(Signed)

W. J. NELSON, M. D.
Township Physician.

RARITAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph L. Moss, Sr., Metuchen; Luther H. Tappen, Metuchen; Alfred Mundy, Metuchen; Theo. A. Wood, Secretary, Metuchen. F. B. Norton, M. D. Physician.

Nothing done by the Board.

Nothing new to report.

(Signed)

THEO. A. WOOD,
Assessor.

THE BOROUGH OF SOUTH AMBOY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

F. E. DeGraw, (Mayor,) South Amboy; John Scully, Councilman, South Amboy; Patrick Campion, Councilman, South Amboy; John Sexton, Councilman, South Amboy; James H. Gordon, Councilman, South Amboy; Ward C. Perrine, Councilman, South Amboy; Bernard Roddy, President. Bernard Roddy, Health Inspector.

On the south side of Raritan bay and at the mouth of Raritan river. Has natural advantages for drainage but not utilized by the people to any extent until this year.

Water supply entirely from wells, many of them so carelessly constructed and their proximity to closets and cesspools make them a source of danger to many of the people. Some improvement in this direction has been shown during the past year. The question of a water supply for the borough will be an important one next year.

Until the past two years little had been done in drainage and sewerage, this year however considerable has been done in this direction, many low places have been filled up and streets graded to carry the water to the bay.

The public ground on "Clinton Park" has been much improved during the year. A borough hall costing \$11,000 has been erected thereon and considerable improvements to the grounds and approaches is a pleasing result of the labors of the authorities.

Houses frame and generally for one tenant. More than one-half of the occupants own the dwellings, except in very few instances the premises are well kept and improvements made. Recently

REPORT OF THE BOARD OF HEALTH.

There has been paid to sanitary matters in the construction of the town showing a decided advance on former years.

Kerosene oil has been the only means of lighting to the present year. This year electricity has been in use for street lighting and in a number of dwellings it has been introduced. In another year it may be in general use.

The question as to the disposal of excreta has been our greatest object. With a constantly increasing population and the most efficient closet system, it has been one of the greatest sources of danger. Many of our people have been disposing of excreta as convenient, rather than as a regard for the public health would suggest. Much difficulty has been met in compelling some of the more ignorant to comply with the ordinance of the Board of Health. However, an advance has been made in this direction.

Two slaughter-houses are maintained, and except on one or two occasions they have been kept in good condition.

School houses are good brick structures and have all ordinary improvements for ventilation, heating and light.

Five cells for prisoners are provided in the borough hall, and as everything is new they are in good condition. Our police force, though not large, meets the wants of the community.

Health laws have been distributed among the people, and the inspector has made over 100 visits to compel or induce by moral persuasion an observance of the laws.

The collection of vital statistics has not been attended to as it should. The physicians do not comply as fully as they should. The community has so recently come out of the simple government of the township that the importance of the new powers that be are hardly realized.

The sanitary expenses of the year will amount to less than \$300.

Scarlet fever and diphtheria prevailed to some extent in the early part of the summer and in October. About fifteen deaths occurred in all. Every precaution was taken to cause prompt burial and prevent the spread of the diseases. Malaria and its attendant fevers have been less in the number of cases.

While much is to be done to place South Amboy in a good sanitary condition, yet the year just closed shows considerable improvement in our condition. The citizens are becoming interested in the

proposed sanitary improvements, which is a great point gained in supporting the efforts of the Board of Health.

I might write much more but the above will give a general idea of our sanitary condition.

(Signed)

BERNARD RODDY,
Inspector.

SOUTH BRUNSWICK.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

H. E. Hathaway, Chairman, Monmouth Junction; W. W. Cozzens, Dean's Station; G. W. M. Mount, Kingston; G. D. Van Dewees, Town Clerk; F. G. Stevenson, Assessor, Dayton.

WOODBIDGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Bernard Dunigan, Woodbridge; Albert D. Brown, Woodbridge; John Lockwood, Woodbridge; Samuel P. Harned, M. D., Woodbridge; Isaac Inslee Woodbridge.

The local Board of Health has had but little to do this year owing to the season. There are no prevailing disease and the township is comparatively healthy more so than usual. The Board have had a number of meetings but few complaints. We have been careful to have stagnant pools drained, hence our good condition.

(Signed)

ISAAC INSLEE,
Assessor.

MONMOUTH COUNTY.

ASBURY PARK.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. D. Pennypacker, President, Asbury Park; J. A. Bradley, Asbury Park; David Harvey, Jr., Asbury Park; E. G. Harrison, Asbury Park; John Rockefeller, Asbury Park; N. E. Buchanon, Recorder Vital Statistics, Asbury Park; E. Wright, Inspector, Asbury Park; Porter L. Lippincott, assistant Inspector, Asbury Park; Randolph Ross, Clerk, Asbury Park; Henry L. Ogden, Chemist, Asbury Park; H. Mitchell, M. D., Advisory Physician, Asbury Park.

The usual work of inspection of premises has been continued. An additional health inspector was employed during the months of June, July, August and September, his time being mainly occupied in making the general house-to-house inspection, examining all premises and correcting the records where there has been any alteration. This record shows the sanitary condition of all premises within our jurisdiction, and is open to the public.

Seven (7) cases of scarlet fever, six (6) of measles, and one (1) of typhoid fever have been reported during the year, the case of typhoid fever was imported. No deaths have occurred from contagious diseases.

The water from seventy-five surface wells was analyzed, eighteen of which were found polluted and closed.

The public water supply is very satisfactory; the number of premises now supplied is six hundred and fifty-two (652), an increase of one hundred and twenty-nine (129) since October 1, 1888.

The sewers continue to do their work in a satisfactory manner, and no annoyance has been caused by them. Thirty-five (35) sewer connections have been made this year, making a total of seven hundred and fifty (750).

When our new plumbing and drainage law first went into effect there was great dissatisfaction among the plumbers, but at present they seem to appreciate the efforts of the Board to preserve our health record, and the result has justified the stringency of the Board by the superior quality of the work now done by the plumbers. One hundred and eight (108) plans of new plumbing work have been examined, tested, and approved this year.

The borough commissioners made an appropriation of eighteen hundred dollars (\$1,800) for the removal of garbage, which is collected under contract, but has not given entire satisfaction.

The borough commissioners also made an appropriation of fourteen hundred dollars (\$1,400) to defray the expenses of the Board of Health, which had previously been borne by Mr. James A. Bradley.

(Signed)

W. D. PENNYPACKER,
President.

ATLANTIC TOWNSHIP.

Our town committee have not organized as a Board of Health.

The township has been remarkably healthy the past year. There has not been any contagious diseases in the township.

(Signed)

LEVI SCOBAY,
Assessor.

EATONTOWN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. W. Crater, M. D., President and Inspector, Oceanport ; J. W. Johnson, Chairman, Eatontown ; Jas. E. Borden, Eatontown ; J. Ed. Corlies, Oceanport ; Wm R. Stevens, Assessor, Eatontown.

Wells both dug and driven, cisterns and springs.

Considerable land drained by tile underdrains. No regular system of sewerage, usually tile drains laid to cesspools.

Streets are usually kept in good order, room for improvement however.

As a rule tenant houses are well kept.

Excreta is carted away by scavengers in tight wagons at the expense of the owner of property. Ultimately used in compost heaps and regarded as possessing valuable fertilizing properties.

No cases of contagious or epidemic diseases reported to our Board this year.

Slaughter houses are well kept and very few do much business, the "cressed beef of Chicago" finding favor with retail butchers.

Schools well attended, in some instances rather overcrowded. Buildings kept in good repair. I will shortly investigate them and inquire closely into light and ventilation.

None, we have malice for all, charity for none.

No escapes, possess one (1) steam fire engine, one (1) hook and ladder company ; rarely have fires.

Unsurpassed cemetery accomodations, fine locations, beautiful views.

Have a set of excellent laws, which fortunately are never enforced, every offender has a "friend," so said offender is informed of the law transgressed, and allowed to continue in his transgression.

As far as known the law on reports is obeyed.

Have been able to manage such diseases thus far without building a pest house. We have plans and specifications ready

REPORT OF THE BOARD OF HEALTH.

and by previous arrangement with a contractor, can have building ready for occupancy in very few hours.

Have never exceeded the \$50.00 appropriation thus far.

Stoves, ranges and heaters, ventilation is guarded against as much as possible.

Board has met but once for organization. Have had several complaints of the usual character—sea swill, stagnant water, open drains, &c., all of which I have abated at small expense.

(Signed)

E. W. CRATER, M. D.,
Inspector.

FREEHOLD.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James Bawden, President, Freehold; W. J. McClure, Secretary, Freehold, A. C. Hart, Freehold; J. O. Burt, Jr., Freehold; John Enright, Freehold; O. R. Freeman, M. D., Freehold. W. J. McClure, Health Inspector

A few changes have taken place since the last report from this board.

Two artesian wells have been sunk on the low ground near the track of the N. Y. and Freehold Railroad and east of the town limits, with the view toward a future supply, and water was found suitable for domestic uses. As there was no appropriation for utilizing the same and introducing it for practical purposes nothing further will be done at present. Electric lights have been introduced in the business places, hotels and a few of the residences in the lower part of the town. The plant is owned by the Gas Company.

A portion of South street, having the most travel, and extending from Main street to the crossing of the Pennsylvania Railroad, has been laid with what is known as the Telford pavement, which promises to be substantial and a great and desirable improvement over the old and worn out gravel road. All such improvements contribute to the healthfulness of the neighborhood and the town. Should the experiment prove a success other portions of our much neglected thoroughfares will in due time undergo the same transformation.

Owing to the increased water fall quite a number of cellars which heretofore have remained dry have had water in them, and in some

cases have been inaccessible for the time being but unattended with any unfavorable results.

The condition of the slaughter house is much improved over the previous year; the parties most aggrieved and with whom complaint originated reconsidered the matter and by petition to the board favored a continuance of the business under certain restrictions and until the expiration of the present lease. We are keeping a watchful eye over the premises and will not suffer it to become offensive or a matter for complaint.

Our public school building has been enlarged with an addition of about half the size of the original, which is sufficient for the better accommodation of the scholars for some time to come.

The town commissioners appropriated \$150 for expenses of the board, which has been sufficient to meet all demands for the year.

The year has been one with a good showing for health and free from epidemics.

W. J. McCLURE,
Secretary.

HOLMDEL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Morrell, Treasurer, Keyport; James W. Hoff, Keyport; Michael Taylor, Holmdel; Aaron Longstreet, Secretary, Keyport; Dr. Henry G. Cook, Health Officer, Holmdel.

HOWELL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Lutz, Farmingdale; Charles Donahay, Turkey; Charles P. Lafetra, Squaukum; James H. Butcher, Secretary, Turkey; Stephen M. Disbrow, M. D., Health Inspector, Farmingdale.

Water supply is from wells and is generally soft.

Drainage is good and no necessity for public draining, although some cellars have been wet this year as there being so much rain, swamps are well drained as being almost all under cranberry culture.

Mode of light entirely by kerosene.

No prevalent disease this year.

Slaughter houses well kept and no complaint.

Two manufactories, one piano and one powder.

School houses and grounds are in good condition.

The regulations pertaining to health have been well looked after by our Inspector. The Health Board have been frequently called together and several complaints have been remedied.

Vital statistics are received and sent in every month.

There is not much to report from our township as it is large in territory and generally healthy.

(Signed)

JAMES H. BUTCHER,
Secretary of Board.

LONG BRANCH CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. W. Silkworth, President, Long Branch; E. B. Blaisdell, Secretary, Long Branch City; Geo. W. Brown, Jr., M. D., Long Branch; J. W. Taylor, M. D., Long Branch; James P. Connelly, Long Branch; Charles Morris, Long Branch City; Alexander Cooper, Long Branch. Hugh R. Herbert, Health Inspector.

Water supplied partly by running water and remainder from wells.

All hotels and many private houses are connected with sewer where possible.

Streets not paved. Public grounds in good condition.

Houses generally occupied by one family.

Excreta carted away by scavengers.

Schools well ventilated and some heated by steam; all in good condition.

We have hospital well-equipped and supported by the public.

There are but few fire escapes attached to buildings.

Ordinance of Board of Health in effect.

Vital statistics are collected by Secretary of the Board of Health.

Heated mostly by stoves; ventilated by windows and doors.

Three cases of typhoid fever.

The sanitary condition of Long Branch has been very good during the year.

The water furnished by the Long Branch Water Supply Company is good ; a large number of wells are used.

The hotels, and many dwellings have connection with the sewer. It is needed in many streets yet ; all the western part of the town is without the sewer.

Efforts are being made to macadamize our main street which, if done, will be a great sanitary improvement.

Garbage and refuse matter is carted away during the summer by wagons that call daily at residence, under the direction of the Board of Health.

Electric lighting for streets has recently been adopted.

A certain amount is appropriated each year by the Long Branch Commissioners for the use of the Board of Health.

MANALAPAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William C. Bowne, Chairman, Freehold; William H. Reid, Tennent; H. W. Long, Englishtown; S. C. Bowne, Assessor, Englishtown; A. T. Applegate, Physician, Englishtown; J. C. Suiphen, Clerk, Tennent.

Wells, cisterns and springs furnish the water supply. The water has some iron in it. Have both hard and soft water.

Surface drainage and under drainage.

No prevalent disease has existed.

Slaughter houses are kept in good order.

No factories in the township.

School facilities are kept up to the ordinary standard.

Returns are recorded and forwarded by the assessor.

Our board is governed by the law in regard to vaccination.

(Signed)

W. C. BOWNE,
Chairman.

MARLBORO TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Ely; Marlboro; Wm. Carson, Holmdel; Peter C. Vanderveer, Wickatus; William C. Hulse, Marlboro. John W. Herbert, Assessor.

MATAWAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

S. A. Close, Matawan ; Garrett Hendrickson, Matawan ; J. F. Lisk, Matawan ;
D. C. Mealio, Matawan.

We have about four hundred acres in own incorporation with no stagnant pools, and the township is in a good sanitary condition, the village of Matawan is situated between two creeks which gives good natural drainage and a great portion of the refuse is carried by the flow of the tides, we are troubled very little with malaria and the cases are very rare, they are generally contracted elsewhere or caused by undue exposure.

In regard to the supply of water we depend entirely upon wells, and as a rule the water is hard but good and slightly impregnated with iron but it has no bad taste. There are a very few who depends on cisterns.

In regard to the dwellings they are built with cellars and used for storage purposes, there are some few that are built with cellars and used for storage purposes, there are some few that are built with basements and are occupied, but as a rule they are damp.

We dispose of our refuse and excreta to the farmers, they make a compost of it and use it for fertilizing purposes.

We have had no contagious disease here for the past year and very little sickness.

(Signed)

D. C. MEALIO,
Assessor.

MIDDLETOWN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Van Mater, M. D., President, Atlantic Highlands; R. S. Snyder, Secretary, Middletown, D. D. Hendrickson, M. D., Township Physician, Middletown, Township Committee, New Monmouth; J. H. Brainard, Township Committee, Highlands.

This township is most eligibly located, being and lying between the waters of Raritan and Sandy Hook bays on the north and the Navesink and North Shrewsbury rivers on the east and southerly

boundaries, with its lands sloping from the famous Middletown Hills in either direction. Its population in 1885 was 5,802, which has increased very largely since taking the census in that year.

Its climate is more temperate and free from extremes of cold and heat than in other localities, on account of its being largely surrounded by water.

Its natural advantages by reason of its heights and drainage and location has led to new settlements by those seeking summer homes. Its topography lending enchantment to the eye, being delightful views from its heights and constant variety by its contour, leading all to enjoy long drives over its ever varying scenes among its hills and vales.

Its water supply is most healthful, being natural springs from the hillsides. Some, indeed, never failing almost on the heights of the highlands of the Navesink, which, with a little artificial arrangements, supply a never failing run of pure spring water.

By reason of its topography it has natural sewerage where the forces and supplies of natural water facilities flood and flush all necessary parts of the premises. The meadows adjoining the shores are washed and delivered of all waste and sewage by the ebb and flow of the tides.

Public roads are being largely graded and graveled, and the streets of the Atlantic Highlands Borough have been graded and are easily delivered of surplus water by rains or floods.

Houses are being built both elegant in style and material, and the city denizen pay from \$250 to \$1,200 for three months' rent.

Artificial light is almost wholly produced by kerosene of 150° test, very much of it being stored at the private homes by the barrel for light and the kerosene stove.

Among the farmers and rural homes the refuse is added to the manure pile, and in the borough the same is carried to pens beyond the bounds of the town. The excreta is also carried to the farm for a fertilizer.

The markets are found among the summer residents, and the community not producing. The surplus is taken to the cities.

There has been no disease among the animals during the year.

There are no slaughter houses of note in our bounds, our meats being brought mainly from New York and depots of western killed stock.

REPORT OF THE BOARD OF HEALTH.

1 We have no manufactories in our borders, but mechanics and
men are fully employed, and more in demand.

2 Tools and school houses are improving in character and being
added, and the teachers obtaining a good salary, and the houses
being supplied one by one with the new and unique furniture.
There are but few of the barn-like structures remaining, which ex-
tend to the shame of the narrow-minded tax payers of their district.

We have no paupers nor charity institutions, nor do we have the
power to invest our dwellings to any extent.

Our police hardly warrant the name, and an arrest is an excep-
tion being quite unusual.

3 Fairview Cemetery in this township, is used for other town-
ships and towns with our own, and is kept above the average in its
neatness and taste, as to the grounds and drives.

4 Where there has been any suspicion of disease breeding matter—
moral or other—the Board of Health has been efficient and prompt
in making and enforcing ordinances for the community so exposed.

5 There has been no contagious disease during the year, and vac-
cination has been compulsory where any were found neglectful.

6 The expenses for sanitary purposes and expense of the Board of
Health have been merely nominal.

Most of the dwellings are heated by stoves with coal, and ven-
tilation is natural and full.

There has been no prevailing disease during the year, although
the city has sent many strangers in our midst, and our shores are
contiguous to several of our communities.

(Signed)

R. S. SNYDER,
Secretary.

MILLSTONE TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Geo. M. Davison, Chairman, Perrineville; Albert Thompson, Clarksburg;
Rainbert Ely, Ely; Geo. J. Ely, Secretary, Perrineville; R. M. Smith, Health
Inspector, Perrineville.

The Board of Health met at Clarksburg, on the 26th day of Oc-
tober, 1889, and would report no change from last year.

(Signed)

GEO. M. DAVISON,
Chairman.

NEPTUNE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

S. W. Kirrbride, Asbury Park; J. C. Patterson, Ocean Grove; Jeremiah Newman, Asbury Park; Dr. H. T. Kinmonth, Asbury Park; L. E. Watson, Ocean Grove.

The local Board of Health have not had much trouble this year. The low lands west of Ocean Grove and Asbury Park make all the trouble. We have had five cases of diphtheria outside of the Grove and Park. There is no quarantine. Have now two cases of scarlet fever, but it is not spreading. West Grove has artesian well water; West Park, driven wells. Everything else is about the same as last year.

E. L. WATSON,
Clerk.

OCEAN GROVE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. H. Stokes, President, Ocean Grove; J. L. Hays, Ocean Grove; Holmes Murphy, Ocean Grove; Jos. H. Thornley, Ocean Grove; I. H. Alday, M. D., Ocean Grove; Rev. Geo. W. Evans, Ocean Grove; A. E. Ballard, Clerk and Health Inspector, Ocean Grove.

The annual spring and fall inspections show that the large majority of our residents endeavor to observe the sanitary laws.

The garbage is carted away, between one and two miles, each day in the summer—three times per week at other parts of the season. It is mostly fed to animals and the remainder is composted. Improved methods for its collection and distribution are in process of arrangement.

Plans are being prepared for a second sewer system, which will, when perfected, bring the thirty lots which cannot now connect in union with the general system. In the southern part of the Grove, in cases of long rain storm, the water sometimes rises above the floors of the cellars. Most of these are being cemented, while others are being filled.

There are 764 connections with the sewer system, 120 of which have been made this year. This leaves a little over 100 residences

RT OF THE BOARD OF HEALTH.

it yet connected. One-third of these are arranging for it now, and the rest are being pressed into it as rapidly as the circumstances safely permit.

A man is being trained who will devote the necessary time in the summer to regular daily inspection.

A new plumbers' ordinance, similar to that of Asbury Park, has been adopted, and better plumbing already begins to be apparent.

odorizers, in cases of nuisance, are freely used, and charged to the property owners.

The streets have been kept free from impurities, except where a violent rain fall has washed some places, and water has stood on a few days before the streets were mended. No case of evil, so far as we know, has resulted.

There are 765 connections with an artesian well system, of which 149 were made this year. The water still retains its singular purity, and six new wells are to be sunk this winter for the supply of the increasing demand.

The streets have been sprinkled this year with salt water. The experiment promises favorable results.

The physicians report that notwithstanding the severe rainfall of the season, the Grove has been exceptionally healthy. There have been a few mild cases of fever, diagnosed as produced from over-eating and exposure upon the sands after bathing. In the early part of the season, extending over a period of four months, there were reported eight cases of diphtheria, four of which were fatal. It seemed impossible to trace them to any definite source except the first, which appeared to come from outside contagion. The best known methods of isolation, fumigation, disinfections and other sanitary rules were enforced, which probably accounts for the fact that the disease did not spread among the people.

All the upper part of Wesley Lake was dug out in the winter and the accumulated mud removed and used as fertilizer.

In the early spring some of the pipes of the sewer outlet lying in the ocean became disarranged from a floating wreck. The tides were exceptionally high all the spring and summer so as to interfere with their proper replacing, and a great deal of annoyance was the consequence. A new system of jetties is proposed, which it is hoped will relieve any danger for the future.

The water reservoir is to be raised thirty feet, in order to secure a fuller water pressure.

(Signed)

A. E. BALLARD.
Health Inspector.

RED BANK.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

R. Allen, Jr., President, Red Bank; John H. Cook, Secretary, Red Bank; Dr. A. F. Trafford, Red Bank; M. M. Drohan, Red Bank; Samuel Cullington, Red Bank. James Norman, Inspector, Red Bank.

The report for last year will cover pretty much all the features of the present year.

The town of Red Bank has considerable new territory added to it by a law passed at the last Legislature. The town as at present constituted has not been surveyed so as to ascertain the exact number of acres. The population of the town, including the added portion, is estimated at 4,500 to 5,000.

The town voted an appropriation of \$25,000 last spring to increase the water supply. Three new artesian wells have been put down to the lower stratum of water bearing sand, and the supply has been increased nearly or quite three fold. The use of this water is constantly increasing and wells are gradually being abandoned.

Whooping cough has been very prevalent during the past few months, and two deaths from this cause have occurred. Children affected with this disease are not permitted to attend the public school.

(Signed)

JOHN H. COOK,
Secretary.

SHREWSBURY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John W. Child, Red Bank; W. Tabor Parker, Little Silver; W. H. Boardman, Little Silver; Thomas P. Brown, Assessor, Red Bank; Thomas Curtis, M. D., Red Bank; Albert C. Harrisson, Clerk, Red Bank.

T OF THE BOARD OF HEALTH.

Water supply by wells. In some localities iron discolors it but generally good.

Cellars dry.

All the houses have cellars used altogether for the storage of vegetables. Not many have more than one family.

Most of the houses have no cesspools, what few have are built on an open bottom, many with a barrell with no bottom emptied by soakage and the solids by throwing out and using on the land. No prevalent disease.

No inspection of slaughter houses, as none are used outside corporations.

Dysentery has been very prevalent in this township this year with several fatal cases being reported.

(Signed)

THOMAS P. BROWN,
Assessor.

UPPER FREEHOLD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joe. Holmes, Jr., Cream Ridge; I. S. Drawes, Imlaystown; C. C. Wikoff, Imlaystown; Dr. F. Price, Imlaystown; Albert Nelson, Nelsonville.

Private wells supply water.

By ditches, gutters, tile drains, &c.; no sewers, most cellars are dry at most seasons of the year; no swamps or malaria.

Very few houses have basements, most of them have cellars which are used only for storing vegetables necessary for use of family residing in house; very few houses contain more than one family.

Kerosene principally used.

No sewers, no cesspools; refuse either carted away or carried off by open drains.

No large markets, small ones clean.

Very little disease to date.

No slaughter houses except two small ones which are very properly conducted.

All cemeteries are so situated as not to be dangerous to health.

Most people burn coal for heating purposes exclusively, although some burn both wood and coal and a few wood exclusively.

(Signed)

ALBERT NELSON,
Assessor.

WALL TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

James L. Allgor, New Bedford; John M. Allen, New Bedford; B. Newberry, Manasquan; A. A. Higgins, M. D., Manasquan; Henry Wainright, Bridle.

There has been no meeting of the Health Board since my last report. The township I think has been healthy except a few cases of typhoid fever at Spring Lake during the summer and they were kept very quiet, all I know about it is from hearsay. I know of no nuisances. In the summer we have very much rain and the cellars filled with water, but that was got out as soon as possible. You will please notice that Belmar, formerly Ocean Beach, is incorporated and has a Health Board, likewise North Spring Lake and Manasquan, the rest of the township is principally farming lands and are kept healthy.

JOHN M. ALLEN,
Assessor.

MORRIS COUNTY.**BOONTON TOWN.****NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Dr. A. E. Carpenter, President, Boonton; Dr. John G. Rogerson, Boonton; William Grubb, Boonton; William J. Powers, Boonton; R. H. Richards, Health Inspector, Boonton; John Warfield, Health Inspector, Boonton.

A full report of our town will be found on file. The general health at present is very good, and there is no disease of any kind reported.

(Signed)

JOHN DUNN,
Town Clerk.

BOONTON TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Ellis G. Myers, President, Boonton; Thomas Byard, Boonton; Horace Ford, Boonton; Gilbert D. Crane, Clerk, Boonton; Joseph Steventon, Assessor and Health Inspector.

REPORT OF THE BOARD OF HEALTH.

As the most part of the township is within the corporate limits of the City of Boonton, the clerk of which has already reported to you, and the general health being very good, with no changes in any of the scheduled facts from last year's report, I refer to it for all particulars.

(Signed)

JOSEPH STEVENTON,
Assessor.

CHATHAM TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF	MEMBERS AND HEALTH INSPECTOR.
J. M. Tunis, Chairman, Afton; B.	et, Madison; Dayton Baldwin,
New Providence; Edward P. Miller, St	Chatham.

Population about 3,000.

Location and climate about the same as last year.

Mostly from springs, cisterns and wells.

There is no system of drainage.

Have streets, but no public grounds.

Houses are mostly owned by occupants; a few are rented.

Refuse and garbage buried in the ground.

Five markets.

Have had no contagious diseases.

There are four slaughter-houses and they are kept clean.

We have all kinds of trades, and manufactories for making paper, sash, doors, brooms, bricks, wagons and carriages, etc.

This township is well supplied with public and private schools.

Have no poor-house in this township, but have a share in county poor-house. The people are all very charitable.

Have seven special police appointed by the township committee. There is no lock-up.

Four cemeteries and burial places.

Some have steam, but mostly all furnaces and stoves.

Have had no prevalent disease to speak of this year.

CHESTER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.
John Kelsey, Chester; R. C. Carlile, Chester, C. H. Ming, Chester; W. E.

Young, Chester; W. A. Green, M. D., Chester. W. A. Green, M. D., Health Inspector.

During the months of December, 1888 and January, 1889, we had several cases of diphtheria, two of which were of unusual severity, and resulted in death.

During the winter of 1888 and 1889, we had a great many cases of pertussis; there were but few bronchial complications, however, and no deaths.

In the early spring of 1889, we had more cases of pneumonia than we usually have at that time of the year, and quite a number of them of unusual severity; no deaths, however, so far as I know, resulted from it.

In April and May we had some dozen or fifteen cases of scarlatina-simplex, but only one proved fatal, and that was a child poorly fed and illy cared for.

The excessive rainfall during the past season filled the wells, springs, and streams with surface water impregnated with poison, in consequence of which, together with the heat, we had an unusual number of cases of dysentery, but all recovered. Typhoid fever here is very infrequent. In the month of August we had two cases in the village, both of them young ladies, thirty years of age, and both of them proved fatal.

Malarial troubles have been less frequent this year than for several years past. Upon the whole, we have had more sickness here during the past year than for several years last past.

No diseases have been reported of animals.

I require all contagious diseases to be reported to me, and then I enforce a strict quarantine, thereby preventing their spread.

(Signed)

W. A. GREEN, M. D.

HANOVER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. P. Cooper, M. D., Troy Hill; George Bates, Parsippany; Marcus Dixon, Pine Brook; Walter Mitchell, Whippany.

The water supply is mostly wells and springs, the part lying in Boonton park depends on cisterns.

There is but little drainage except natural.

The cellars are I think, very dry. There are few houses with basements, the cellars are mostly all used for storing vegetables.

I know of no houses with more than two families.

The assessor does not inquire as to the loss of animals, if there is anything unusual we hear of it.

I do not : the slaughter houses are inspected.

The whole eastern edge of the township is bounded by meadows and large meadows through the eastern part of it. The last 3 years they have been under water half of the time, but they claim

way neck and ne. the most healthy places in State, we very : ar of a of chills. There has been one in this part in :

The camp ground at Mount is in this township. The water supply is from a spring force the top of the hill.

(Signed)

JOS. H. BASTEDO,

Assessor.

JEFFERSON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Tallman, Chairman, Oak Ridge; Albert J. Fitman, Woodport; Charles Jennings, Milton; Stephen A. Lindsley, Milton.

The year ending October 1st, 1889, has been with us remarkably healthy. We have very few changes to report.

Water supply is from wells and springs. It is soft, except in the vicinity of iron mines, where it is hard. It is not bad at any time. No families use cistern water for drinking purposes.

No public system of drainage or sewerage; the surface drainage being all that is required. Cellars are dry. Some swamps, but the rainfall for the past year having been so great they have remained filled, consequently no evil results from them.

Most houses have cellars largely used for storage of vegetables in winter. No houses with more than two families.

No sewers used. No cesspools. Common privies without vault; contents in some cases used for fertilizers.

No prevalent diseases this year.

No slaughter houses in the township.

No manufactories.

Schools in good condition and well attended. No other public buildings unless churches are considered as such.

No alms-houses.

The law is strictly enforced in regard to the burial of the dead. There are four burying-grounds in the township.

We have no special public health laws and regulations.

Returns of vital statistics are sent in.

We have no plan for dealing with contagious diseases.

Most of the houses are heated with stoves, burning coal or wood. A few are heated with steam.

No prevalent diseases this year.

There is a vacancy in our Board of Health, caused by the death of Dr. Leonard Bright, our township physician. His place is supplied as a physician by Dr. Sylvester Utter, who has recently moved into the township. His address is Woodport.

(Signed)

ALBERT J. FITMAN,
Assessor.

MENDHAM TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. John S. Stiger, Mendham; Marcus Robinson, Mendham; Joseph Campbell, Mendham; M. M. Connett, Brookside.

In regard to the general health of Mendham township. It is thickly populated and the health is generally good.

(Signed)

JNO. R. NESBITT, JR.,
Assessor.

MONTVILLE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Husk, Jr., Montville; Walter A. Young, Pine Brook; Garrett B. Jacobus, Glen View; Asa T. Cook, Assessor.

MORRIS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thos. F. Clifford, Assessor, Morris; John Denmar, William H. Mesler, Edgar L. Darling, Township Committee, Morris.

City of Morristown is supplied by "the Morris aqueduct" water. In parts of this city wells and cisterns are used.

No drainage and sewerage.

In the city there are several ~~large~~ tenant-houses. Most of the uses have cellars they are usually ~~used~~.

Excreta and refuse is removed by a odorless excavator conducted by a private enterprise.

None of any consequence.

Public health has been good.

Several cases of diptheria also several cases of scarlet fever.

(Signed)

THOS. F. CLIFFORD,
Assessor.

MOUNT OLIVE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George A. Smith, President, Drakestown; Samuel S. Wills, Treasurer, Stanhope; Nelson Salmon, Flanders; Dr. D. W. Crawford, Flanders; Enos G. Budd, Assessor and Health Inspector, Budd's Lake.

Refuse and excreta used upon the lands by farmers and others.

No diseased animals as yet reported; inquiry made.

Slaughter-houses kept without complaint.

Sanitary expenses in compliance with the laws.

Health of the township generally good.

Our Board can be called by our recorder, who is instructed to take special notice as sanitary inspector, and act thereon as may be deemed necessary according to exigencies.

(Signed)

G. A. SMITH,
President.
EMOS E. BUDD,
Recorder.

PEQUANNOCK TOWNSHIP.**NAMES AND POST OFFICE ADDRESSES OF MEMBERS AND HEALTH INSPECTOR.**

Wm. H. Beam, Assessor, Pompton Plains; R. T. Budd, Chairman, Mountain View; Samuel DeMott, Treasurer, Pompton Plains; F. L. Leis. Butler; H. V. Day, M. D., Bloomingdale.

Our township has been very healthy for the most part the past year, considering the wet season. Some few complaints of nuisance at Butler were made, which were removed on notice by one of the members of the local Board of Health.

Slaughter houses are kept very clean by the owners themselves, no stench whatever from them.

(Signed)

WM. H. BEAM,
Assessor.

RANDOLPH TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

There has been no organization of Board of Health in this township to my knowledge.

D. S. ALLEN,
Assessor.

ROCKAWAY TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

James B. Tonking, Mount Hope; Edward Fox, Rockaway; Augustus Munson, Hibernia; John A. Fichter, Assessor, Rockaway.

Water supply is from wells and cisterns exclusively, very few depend entirely on cisterns.

No system of drainage distinct from sewerage. Neither is there a system of sewerage in any part of the township. The usual water level, with very few exceptions, is such as to secure dry cellars. There are, of course, in the township a number of swamps, not very great in extent.

Houses generally have cellars, used in the ordinary way for storing winter supply of vegetables, fruits, etc. Only a few have basements which are occupied. Houses generally occupied by only

one family, except among mining districts, where tenement houses are occupied by two families and sometimes three families. In the township there are about one hundred and fifty tenement houses occupied by two families.

The cesspools are nearly all built with open bottom and sides. There is no system for the disposal of refuse and excreta, except what is used by the farmers as manure.

There is no prevailing disease nor has there been any for the past year among animals.

There are five slaughter houses in the township of which no complaints have been made. Their sanitary condition is as good as could be expected.

The following is a list of new factories: The City Knitting Mills which employs about forty adults and children under sixteen years, (of both sexes) and the Rockaway Manufacturing Company which employ about thirty persons mainly male adults. These buildings are both well ventilated and are heated by steam. Both also are well supplied with proper out-houses.

There are ten school houses all in good condition, four of them being heated by steam and the rest by coal and wood. Said buildings are occupied for school purposes ten months a year. There has been a new Town hall built in the town of Rockaway within the past year and a half. The principal use of which is election purposes and township business.

There is a room in the Town hall used as a prison cell. There is a detective agency in the township who have their headquarters in said Town hall.

For heat, wood, coal and steam. For ventilation, doors and windows.

An epidemic of diphtheria is now prevalent at Hibernia. It began early in the summer and still continues, but not to so great an extent as at its inception. The rate of mortality was high, some families losing from one to three.

There are no markets in the township, no prevalent diseases among cattle, no almshouses nor hospitals, no police nor prisons, no fire guards, no public health laws and regulations, no quarantine or care over contagious diseases and vaccination, no sanitary or physician fund.

A record is kept of marriages, births and deaths in a book kept for that purpose.

(Signed)

JOHN A. FICHTER,
Assessor.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

F. M. Stephens, German Valley; E. C. Willet, M. D., German Valley; Philip Schuylor, Parker; W. N. Swackhamer, Middle Valley; Henry Wiley, Drakes-town.

There is no prevalent disease to be reported and no complaints have been made to the Board during the last year. Other things same as previous reports.

F. M. STEPHENS,
Assessor.

OCEAN COUNTY.

BERKELEY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Cornelius Lawrence, Bayville; Thomas J. Harvey, Bayville; Frank Wilsey, Tom's River; Henry Williams, Assessor, Bayville; Divine Butler, Town Clerk, Bayville.

BAY HEAD.

Has no organized Board of Health.

Bay Head is situated on the coast at head of Barnegat Bay. Population in summer, 800; in winter, 100.

Soil sandy, beach and about one-quarter mile to W. Pine and cedar growth, also swamp.

The water supply is from an artesian well 765 feet in depth, and very pure at all times of the year. Our citizens are all supplied with it through tar-coated iron pipes and mains.

Some cesspools are open and others cemented, all being cleaned once every two or three weeks. As our water supply is artesian we have no unhealthy effects from our drainage system, which is the best. Our place being a level plain, no malaria or fevers; place perfectly healthy, and considered one of the finest seaside situations along the New Jersey coast.

Streets graded with good clay and kept in good order and repair. No debris or nuisances being allowed upon same.

Kerosene and lamps in general use.

Garbage carted away every night. Closets are looked after every evening, as we use the pail system.

No slaughter houses.

Fine school. Just built and in good running order. The only other public buildings are two very nice churches, one Presbyterian, the other Episcopalian, also a large amusement hall, together with a borough hall.

(Signed)

WILLIAM R. GULICK,
Assessor

EAGLESWOOD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel Ashurst, M. D., Beach Haven; John F. Jones, West Creek; Clara Seamen, West Creek, Joseph P. Haywood, Chairman, Health Board. Samuel P. Cranmer, Health Inspector.

As to the health of Eagleswood township, it is good. No contagious diseases.

Water supplied by wells; water generally good.

Drainage natural.

No complaints as to nuisances.

(Signed)

S. P. CRANMER,
Assessor.

JACKSON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph T. Clayton, Jackson's Mill; Joseph R. Brown, Cassville; John W. Jamison, Cassville. C. M. Thorne, Assessor.

LOCAL BOARDS OF HEALTH.

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LACY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas Vanarsdale, Cedar Creek; Garrett Stout, Cedar Creek; Frank Matthews, Forked River. C. B. Weeks, Health Inspector.

There is nothing of importance to report this year. We have had no unusual amount of sickness, no epidemics, no change in drainage or water supply.

(Signed)

C. B. WEEKS, M. D.
Inspector.

LAVALLETT.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Kerr, M. D., University of Pennsylvania, 1864, and Mayor of the borough. No Board of Health.

On the Atlantic coast, sixteen miles below Asbury Park.

Lowland. Sandy soil.

The water supply is from driven wells.

Streets are marked out but not graded.

No drainage system, except good natural drainage. No swamps.

Houses occupied mostly during the summer.

Cemented cesspools. Emptied when necessary.

(Signed)

GEORGE KERR, M. D.
Health Inspector.

MANCHESTER TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Irwin W. Kirk, M. D., Manchester; Chas. P. Heavalind, Michael McCallion, Wm. Montgomery, committee, Manchester. C. F. Pearce, Assessor.

Water supply from open wells and driven pumps. Its nature is clear and soft.

Drainage chiefly by ditches and natural streams, land generally high as to secure dry cellars, swamps near but streams of pure water running through them, malaria not frequent.

Streets and public grounds kept clean.

Houses in fair condition with mainly but one tenant to each.

By kerosene lamps.

Cesspools rare, except the old style of common built water closets.

Ordinary stores and meat shops.

Animal diseases rare, meat shops supplied from foreign markets.

No manufactories, mainly carpenters.

Good schools, buildings and public houses kept in good condition.

Cemeteries and burial grounds properly looked after.

Public health good.

Vaccination too slightly looked after.

(Signed)

C. F. PEARCE,

Assessor.

PLUMSTEAD.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Aaron S. Branson, Assessor, New Egypt; E. A. Horner, New Egypt; W. Scott Rafey, New Egypt; Walter Cottrell, New Egypt; W. T. MacMillan, M.D., Health Inspector.

This township has been remarkably free from all forms of contagious diseases the past year.

(Signed)

W. T. MACMILLAN, M. D.,

Health Inspector.

STAFFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Stacy G. Hazelton, Manahawken; Lewis A. Cranmer, Cedar Run; John Letts, Manahawken; Chas. H. Cranmer, Manahawken. P. K. Hilliard, M. D., Health Inspector.

Located on the coast line, in the southeast portion of Ocean county. Population, about 1,100. Face of country, rolling.

Water supply good, both by wells and springs.

Drainage, good. No public sewerage.

Schools good; school-houses and churches built with the modern improvements..

Climate variable. Surroundings about the same as is usual in common country villages.

Have had no epidemics and very little sickness during the past year.

(Signed)

P. K. HILLIARD, M. D.,
Inspector.

UNION TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Edward Bennet, Barnegat; Joseph Pharo, Barnegat; John Predmore, Jr. Barnegat; Asa Cranmer, Barnegat; L. G. Mitchell, Barnegat.

Have nothing interesting since last year. The general health of the township has been excellent. Very few deaths and no prevalent disease.

(Signed)

L. G. MITCHELL,
Assessor.

PASSAIC COUNTY.

LITTLE FALLS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Elias Van Ness, Little Falls; Squires Radcliffe, Little Falls; Eugene Shire, Little Falls; James DeMouth, Little Falls. Mark Van Winkle, M. D., Health Inspector.

Water supply mostly wells, medium hard, generally good. Comparatively few use cisterns.

No system of drainage. Some of the township naturally drained. Centre of village least drained of all. Numbers of cellars in immediate village damp and wet; rest of township comparatively dry. Malaria not as frequent as usual.

Generally cellars. A small percentage used for vegetables. Very few of more than two families, probably four to six.

No sewers. Cesspools, some cemented but generally open; allowed to empty by soakage in the ground and on the ground.

Water closets in yards mostly cleaned and used for fertilizers on farms in vicinity.

No prevalent diseases this year. No known contagious diseases of animals.

There are no new manufactories in the township. Beatty Manufacturing Company being the only one of any prominence, employing from 300 to 350 hands in the carpet trade.

There are three public schools in township. The one in the center is in two departments, primary and senior, and would say that people have been getting a new heater in this school, hoping to have the school in better condition for the children than formerly. But would also say that the cellar is not properly drained and is damp and musty. Would also state that the water closets for this school are in a filthy condition, especially the boys'.

There are two or three very small and almost disused burial spots in township. Burials nearly all outside of township.

The local health board was constituted this spring, and a code for the protection of the health of the people was acted upon, consisting of four sections and printed according to law, with penalty attached.

No regular registration except what Assessor does in his work with vital statistics, which he has done promptly so far as known.

The District Clerk in the work of census taking looks after vaccination of children, whether it has been done. One school closed last spring short time on account of sore throat and scarlet fever, but was soon continued, the danger being passed.

Expenses for sanitary work so far paid out of general fund of township taxes.

Buildings mostly heated by stoves, a few having heaters in the cellars. Ventilation generally good.

There have been but few deaths in proportion to population in the township this year. Three of the same disease being the most of one kind.

MARK VAN WINKLE,
Health Inspector.

MANCHESTER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Doras W. Warren, Jr., Hawthorn; John W. Campbell, Paterson; Richard E. Doremus, Paterson; Dr. S. C. Townsend, Paterson; Wm. D. Berdan, Secretary. S. Cyrus Townsend, M. D., Health Inspector.

Water from wells, springs, and cisterns.

There is no system other than natural drainage.

No public grounds in township.

Very few houses with basements. All have cellars, used mostly for storage of vegetables. In making the assessment last June I found six or seven houses with more than two families. The Robertson Silk Company have built four very large houses, capable of accommodating eight families in each house.

Since making my report last year Mr. Wm. Bushman has built a large silk mill and six fine dwelling-houses; each house is built for two families.

Some twenty-five or thirty dwelling-houses have been built in the township the past year. We have macadamized between four and five miles of the roads of the township. As to tenancy, some are neat and very precise, others are careless and slovenly. There were several complaints made to the Board of Health last June of full and foul privy vaults and cesspools. The Board ordered an inspection from house-to-house in the village of Haledon, and thirty were notified to have their privies or cesspools, as the case happened to be, cleaned, and the majority complied with the notice, in fact, all but two or three. We had to complain of these and they were fined, and have given no further trouble.

The most of the cesspools are with open bottoms and sides, and emptied in various ways.

The assessor inquires each year as to losses of animals.

No slaughter houses in the township.

No new manufactories other than silk weaving.

There are five school houses and five public schools in the township; school buildings are good. There is one church and one public hall in the township.

There is one Roman Catholic Orphan Asylum for girls in the township.

No police other than three constables; no prisons.

No protection against fire.

There are four cemeteries in the township, one Catholic, one Jewish and Laurel Grove cemetery. Burials are conducted according to law.

We have a code of laws for the health of inhabitants of township. Nothing to report.

We as a Health Board are as careful as we know how, in relation to the health of the people of the township. Have had no contagious diseases to any extent neither have we had any prevalent sickness the past year.

Dwellings are heated with furnaces and stoves, the greater part with stoves, ventilation from doors and windows.

There have been six cases of scarlet fever reported, no diphtheria, no typhoid fever, the health of the inhabitants have been good the past year.

(Signed)

WILLIAM D. BERDAN,
Secretary.

PASSAIC CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. F. H. Rice, President, Passaic; Joseph Adams, Secretary, Passaic; Daniel Demarest, Passaic; Levi Aldous, Passaic; Michael King, Passaic. William Hendry, Health Inspector.

The water is supplied by the Weasel Brook and is supplied by the Acquackanonk Water Company, about half of the houses of the city take it. It is discolored a little sometimes, it has an iron taste and is hard. It is bad sometimes in the summer. The pipes are cleaned and the source from which it is taken, does not to our knowledge receive any sewerage above the point of supply. About one quarter depend on wells and about one-quarter on cisterns.

The system of drainage is by surface, but there is a sewer now in construction. The level in some parts is not such as to secure dry cellars.

The main streets of the city are macadamized, while the rest are good hard roads. We have no public parks or grounds.

The majority of the houses are frame ones and are occupied by from one to seven families. The majority of houses have cellars.

The cesspools are not cemented but have open bottoms and sides and are emptied by sanitary companies.

There have been no prevalent diseases among animals to our knowledge.

The slaughter houses are inspected so as not to be a nuisance.

We have in this city five public schools and two private schools. We have a City Hall and a Public Library.

We have one almshouse, one Home and Orphan Asylum and no hospitals.

Several of our mills and houses have fire escapes and an officer has been appointed to see that all have such.

We have two cemeteries in this city, which are very well seen to.

The health laws are enforced by a Health Inspector.

There is a register of vital statistics.

Contagious diseases and vaccination are seen to by the city physician.

The sanitary expenses are not high.

The majority of dwellings are heated by stoves, and seem to be well ventilated.

The prevalent diseases are malaria in summer and diphtheria at times.

(Signed)

WILLIAM HENDRY,
Health Inspector.

PATERSON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Theodore G. Kinne, M. D., President, Paterson; Cyrus W. Baldwin, Paterson; James Mills, Paterson; Frank E. Agnew, M. D., Paterson; B. C. Maginnis, M. D., Paterson; P. A. Harris, M. D., Paterson; John L. Seal, M. D., Health Inspector.

Water is taken from Passaic river, just above Passaic Falls, and within city limits. Furnished by a private company. In the city there are about 9,200 buildings in which water is used. Of this number about 5,500 are supplied with city water. The rest depend upon wells and cisterns. Water is sometimes discolored after heavy rains. No iron taste; soft; but bad at any season of the year. No regular season for cleaning reservoir or pipes; only done as occa-

sion requires. The river above the intake receives surface drainage of small section of city.

Refuse and excreta are disposed of by means of sewers and cesspools, and mixed with the ashes and dumped upon low and swampy ground. The city is building sewers very rapidly, and the Board of Health is forcing property owners to connect premises and out-houses with them. Over 500 connections have been made the last year. This work will be prosecuted vigorously in the future, until all privies and cesspools on sewered streets shall be abolished. All cesspools built since the organization of the Board of Health have cemented sides and bottoms, and are cleaned by licensed scavengers with odorless apparatus. We are now agitating the question of burning the garbage, and we hope by next summer to have some system of cremation in operation. The present system of its disposal, mixed with the ashes and dumped anywhere in the city where it is not positively forbidden, is the greatest sanitary fault of our city to-day. Markets are inspected.

During last year three horses suffering with glanders have been destroyed by order of this board. We have a register of all persons keeping cows within the city, which they can only do by permit from this board. Pigs we do not allow in city.

The public schools are in a bad sanitary condition, in so far as relates to ventilation. This matter was taken up by the Board of Health during last winter with the result that the Board of Education resolved to better ventilate the four worst schools during the present year. One of them is all completed and in good working order.

A new police station has been built and is in good sanitary condition.

The Board is about to ask the Court of Chancery for relief in the cemetery cases.

On the first of this month a new plumbing and building code went into effect. A plumbing and building inspector was appointed to act under the direction of the Health Inspector. The plumbing code was based upon the model recommended by the State Board of Health. We consider it the greatest step in advance since the adoption of our present sanitary code. Under it we have complete control of all plumbing work done, and under the building section

we control the construction of all tenements and public buildings of every description.

The placard system is continued in cases of scarlet fever, diphtheria and small-pox, united with a personal supervision of these cases by officers of the board. We also require all premises in which these diseases may have existed to be fumigated and disinfected by the proper official of this board. Since the adoption of our present system the number of cases of scarlet fever and diphtheria has diminished about seventy per cent.

Our appropriation is \$3,500 annually, and hereafter in fees under the plumber and building ordinance we expect to receive about \$1,500 more.

During the last year we have had more than our usual number of deaths from pertussis, diarrhoeal diseases, and pulmonary diseases. At the present time typhoid fever is very prevalent, more so than in some years, but of a mild type.

(Signed)

J. L. SEAL, M. D.,
Medical Inspector.

POMPTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

D. A. Wheeler, Eiskine; Martin Drew, Midvale; John F. Sisco, Bloomington; Lemuel Van Ness, Pompton.

(Signed)

MARTIN DREW,
Chairman.

WAYNE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

G. G. Jeffries, Chairman, Mountain View; David F. Duncan, Paterson; Peter J. Doremus, Paterson; James D. Berdan, Secretary, Paterson.

The water of Wayne township is supplied by well, and is very good.

There is no drainage except low grounds, which are ditched. The cellars are generally dry. There are no sewers.

We have no public grounds.

The houses generally have cellars, which are used for the storage of vegetables. There are no houses with more than two families.

There are no sewers or cesspools.

There have been no prevalent diseases during the year. The assessor does not inquire as to losses of animals and contagious diseases.

The slaughter-houses are kept in good condition, and we have heard no complaints.

We have five school-houses that are in good condition. There are two churches.

We have no almshouse or hospitals.

We have no fire-guards or escapes.

There is one public cemetery and several private ones.

We have no public health laws or regulations.

We keep a record of births, marriages, and deaths.

We have no quarantine or care over contagious diseases.

We have no sanitary expenses.

The dwellings are heated by coal or wood fires, and ventilated by doors and windows.

There have been no prevalent diseases during the year.

(Signed)

JAMES D. BERDAN,
Secretary.

WEST MILFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph Henion, Echo Lake, Oscar F. Smith, West Milford; David Vanderhoff, Newfoundland; Theodore Coursen, M. D.; Joseph H. Schulster Assessor.

We have no prevalent disease to report.

SALEM COUNTY.

LOWER ALLOWAY'S CREEK

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John M. Pancoast, Hancock's Bridge; Dr. W. S. Smith, Hancock's Bridge, James Hood, Canton; F. B. Harris, M. D., Canton; Mark T. Hilliard, Assessor, Hancock's Bridge.

MANNINGTON TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

David S. Fogg, Chairman, Salem; D. M. C. Hinchman, Salem; Woodruff Pettit, Salem; Wm. H. Acton, Secretary, Salem.

OLDMANS TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Samuel Stanley, Pedricktown; Frank Gaventa, Pedricktown; Jacob J. Hunt, Auburn; James B. Ware, Pedricktown; Harry Johnson, Pedricktown. Samuel G. Hartman, Assessor.

PENNSGROVE.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Dr. David Moore, Pennsgrove; Sam'l. C. Springer, Pennsgrove; John M. Beirs, Pennsgrove; Albert Straughn, Pennsgrove; Samuel P. Ward, Inspector, Pennsgrove.

There are no prevalent disease and no sickness of any amount. Many of our cellars contain water, which is due to poor drainage.

AMOS MORRIS.

Secretary.

QUINTON TOWNSHIP.

John F. Anderson. Chairman; Wm. Potuck; John G. Fowser; Uz. Ayres; Wm. Good, M. D.

SALEM.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Zaccheus B. Sickler, Salem; Clinton Bowen, Salem; Robert D. Swain, Salem; Josiah Wistar, Salem. C. M. Shenon, City Physician. William Carney, Health Inspector.

Since the date of our last annual report the health of our city has been good. No epidemic diseases have prevailed.

Although our supply of drinking water continues the same as in former years, namely, from private wells, there have been but very few cases of typhoid fever as compared with the two previous years, although the rainfall for the present year has been almost unprecedented.

To remedy, in part at least, the unsatisfactory character of the water supplied to our citizens from Laurel Run (the public water supply) and which has been alluded to in former reports, it has been proposed to provide large filters, such as are used with good results in some cities; but as it would involve considerable expense nothing has as yet been done in that direction.

The introduction of water pipes into private dwellings and the increased number of bath rooms with water closets as an attendant, seems to demand a system of public sewers to effectually carry off the waste, so as not to endanger the health of the citizens; and the subject claiming the attention of our City Council, early in the summer a committee was appointed to ascertain what system was best adapted to this place (the surface being very flat and level) with the probable cost. This has resulted in having a line of sewers laid in one of our principal streets, and with which several house connections have already been made. The sewerage of this street was probably hastened by the very unsatisfactory sanitary condition of the county prison, which is located on this street. The attention of this board having been called to the bad condition of the cesspools connected with this prison, we visited it, and after a thorough inspection, notified the Board of Chosen Freeholders that the evils must be remedied, which could only be done by constructing a sewer, through which the refuse could pass to the creek, so that a considerable portion of the expense of the above mentioned sewer was borne by the county. It is working satisfactorily so far, and we hope at no distant day, the whole city will be provided with sewers.

It is not designed to drain the surface or storm water through the sewers, and we have continued during the past summer, as heretofore, to have the street gutters flushed and thoroughly cleansed once or twice in each week.

As mentioned in former reports we have city ordinances regulating the construction and cleaning out of outhouses, which are but seldom constructed with deep vaults.

The only diseases among animals which we have to note, were some cases of splenic fever, which appeared in the summer or early autumn, among a small herd of cattle belonging to a dealer, and which had been purchased by him at the stock yards in Philadelphia. Three or four of them died ; a post mortem examination of one of which was made by Dr. Miller, V. S., which fully revealed the character of the disease. The remaining animals were strictly quarantined for a suitable time, so the disease was prevented from spreading.

We have had no trouble with slaughter houses since their removal was effected to points more distant from the built up portions of the city.

The number of new manufactories remain about the same as at last report ; and so far as known are not prejudicial to the public health.

The sanitary condition of our public buildings has been satisfactory, with the exceptions already voted ; though complaints are made of the insufficient ventilation of the court room, to which the attention of the Board of Chosen Freeholders has been called.

The condition of the different cemeteries is much the same as previously noted, and is satisfactory : and the record of vital statistics has been actually kept by the City Recorder as provided by law.

There appearing to be some difficulty in draining the lots in a portion of the low lying districts of the city, the Board of Health had a large wooden drain constructed and laid on a line of the rear ends of the lots between two of the streets, so as to drain both sides. This has worked very satisfactorily, carrying the refuse into a ditch leading to the creek. This and the frequent cleansing of the street gutters, constitute the principal sanitary measures undertaken by the Board ; the sewer already spoken of, having been laid under the direction of a committee appointed by City Council.

By Order of the Board of Health,
(Signed)

JOSIAH WISTAR,
Secretary.

SOMERSET COUNTY.

BEDMINSTER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH OFFICERS.

Ralph Davenport, Chairman, Pluckemin; Erastus Randall, Bedminster; Wm Logan, Peapack; John Auble, Secretary, Peapack; E. F. Farron, Physician, Peapack.

There has been but little sickness in our township during the past year. The Board of Health has not been called upon, and having travelled over the township and visited every house, I can say that I do not think it was necessary, except in one instance, when a pool of stagnant water was left standing some days near several dwellings, but the owner attended to it when his attention was called to it. The houses generally have cellars, and I think that they are too generally used for storing vegetables.

Our slaughter-houses are well kept, and not near enough to dwellings to cause annoyance.

There have been a number of cases of meningitis among horses in this township, nearly all of which proved fatal.

(Signed)

JOHN AUBLE,
Secretary.

BRANCBURG TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jno. N. Van Liew, Neshanic Station; Adonis Nelson, M. D., Neshanic Station; C. V. D. Corle, Assessor, Neshanic Station; Wm. H. Doliver, South Branch; Theo. Starner, North Branch.

The local Board of Health of Branchburg township is not, as yet, well organized. Too little interest is manifested by the Board as to the sanitary condition of the township. I think if each township had a health inspector appointed who, for a small recompense, was required to make a sanitary survey of the township about twice a year we would then be able to get a more correct knowledge regarding the sanitary status of the township and, thereby knowing where the defects existed, we would be able to do something toward correcting them. During the past year there has been less

sickness than usual in the township. We have been free from epidemics. There have been a few cases of whooping-cough and parotitis, but the cases were confined to two or three families and did not spread. Fewer cases of gastro-intestinal diseases have been reported during the summer than we have been used to having. One nuisance, in the shape of a pig-sty, was brought to the notice of the Board, which was immediately attended to and the evil corrected.

(Signed)

C. V. D. CORLE,
Assessor.

BRIDGEWATER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. A. P. Hunt, Somerville; A. H. Brokaw, Somerville; James Duhony, Raritan; B. F. Little, Bound Brook; Oliver P. Vosseller, Somerville.

Somerville and Raritan get water from the Raritan river; Bound Brook from a stream known as Chimney Rock stream or brook.

No public sewers, all private. Most of the cellars have good drainage. No swamps near to cause any malaria of any amount.

Some houses have basements. All, or most of them, have cellars. All used to store vegetables for their use. Do not know how many tenement houses have more than two families.

Do not know how far sewers are used. Cesspools are mostly bricked up on the sides, and bottoms left open. Emptied by being carted away.

(Signed)

O. P. VOSSELLER,
Secretary.

FRANKLIN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Peter W. Garretson, Weston; Joseph Christopher, East Millstone; L. J. Snyder, Franklin Park; P. Eugene Nevius, East Millstone.

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The Board has not been called upon to act in any case during the year. We have no special report to make.

(Signed)

P. EUGENE NEVIUS,
Secretary.

HILLSBOROUGH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Peter Sutphen, Chairman, Hillsborough P. O.; George Miller, Somerville; Adam Hummer, Assessor, Millstone; W. H. Merrell, M. D., Secretary, South Branch.

There being no towns or large villages in our township there is little of interest to note. Health has been good during the past year; there has been no epidemic. The Board was once called upon to abate a nuisance resulting from a badly-kept hotel privy.

(Signed)

W. H. MERRELL,
Secretary.

MONTGOMERY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Cornellus B. Cruser, Chairman, Plainville; Thomas Skillman, Skillman, Isaac Williamson, Rocky Hill; A. B. Mosher, M. D., Griggstown; William Oppie, Assessor, Harlingen. William Oppie, Secretary.

The Board of Health has nothing in particular to report this year. We have not been called out since my last report. The general health of the township has been good and no epidemic has occurred.

(Signed)

WILLIAM OPIE,
Secretary.

WARREN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joel Codington, Martinville; Peter J. Zegio, M. D., Warrenville; J. J. Lang, Warrenville, Peter Bower, Warrenville, John D. Bornmann, Warrenville, Committee. Joel Codington, Health Inspector.

Our township is a hilly farming district, generally healthy, there being no contagious diseases. Refuse matter disposed of as is general among farmers. General health has been good.

(Signed)

JOEL CODINGTON,
Health Inspector.

SUSSEX COUNTY.

ANDOVER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George O. Young, Andover; Joseph P. Longcor, Andover; Levi N. Space, Newton; G. C. Cook, Assessor, Andover; J. C. Clark, M. D., Andover.

BYRAM TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel T. Smith, Chairman, Waterloo; Daton Lawrence Stanhope; David Stone, Andover; Dr C. K. Davison, Inspector, Stanhope; D. W. Goble, Assessor, Andover.

Water supply from wells and springs mostly impregnated with iron.

Drainage natural and rapid.

Roads good for mountain districts.

Houses generally have basements which are stored with vegetables and but very few with two families.

Very few cesspools and those are made with cobble stones; no sewers.

We had three cases of scarlet fever. The family came here from Morris county and were sick with the fever when they came here and our township physician took prompt measures and confined them to the one house until they all recovered and moved away; no other cases and no prevalent diseases this year; no diseases of animals.

Slaughter houses kept clean and neat.

No factories but two blast furnaces.

No prevalent diseases only those noted above.

REPORT OF THE BOARD OF HEALTH.

Our local board do not keep a record as they should do, I have tried to induce them to keep such a record.

(Signed)

DANIEL W. GABLE,
Assessor.

FRANKFORD TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR**

Oscar Northrop, Augusta; J. Cole Price, Branchville; Jacob A. Coursen, Branchville; George Phillips, Assessor, Branchville; Dr. Joseph Hedger, Branchville.

GREEN TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

William C. Gray, Huntsburgh; David B. Stackhouse, Andover; G. Irving Lang, Tranquility; Daniel B. Stackhouse, Chairman.

HAMPTON TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Moses Ackerson, Assessor, Halsey; Theodore Harding, Newton; John S. Coursen, Newton; Andrew J. Williams, Pleasant Valley.

We have nothing to report.

(Signed)

MOSES ACKERSON,
Assessor.

SPARTA TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Sidney S. Byram, Sparta; Joseph T. Dolan, Ogdensburgh; Charles H. Beatty, Sparta.

(Signed)

JOHN McMICKLE,
Assessor.

WALPACK TOWNSHIP.**NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.**

Philip S. Rosenkrans, Flatbrookville; John B. Fuller, Flatbrookville; Emmet H. Bell, Walpack Centre; J. W. Bunnell, Assessor. Walpack Centre.

Our water supply is derived from wells, springs and running streams, and has this year been more than abundant. Principally hard water of a limestone nature.

Drainage natural. Cellars dry. Very little swampy land. No sewers. No malaria.

Houses all have cellars, which are largely used in winter for storing vegetables.

No houses with more than one family.

No prevalent diseases of the year.

No loss of animals by contagious diseases.

No slaughter house in the township.

We have no regularly constituted Board of Health in the township, the town committee never have organized as such.

(Signed)

J. W. BUNNELL,

Assessor.

WANTAGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jno. Coykendall, Deckertown; S. M. Parcell, Deckertown; Jacob Swartwont, Deckertown.

Our medical advisor has recently left town, and there has been none appointed, as yet, to take his place.

(Signed)

N. HALL,

Assessor.

VERNON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Carlos Allen, Vernon P. O.; A. S. Blanchard, Assessor, Vernon P. O.; Nicholas Farber, Vernon P. O.; Stephen C. White, McAfee P. O.; Lewis Martin, Glenwood.

UNION COUNTY.

CLARK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Chairman, Wm. H. Enders; Max Reiffee. John A. Haliday; Medical Member, Dr. W. E. Cladek; Assessor, F. P. Bullman.

In the township of Clark there is nothing to report but what has already been reported in previous year.

No prevalent diseases. No complaints as to nuisances. Very little sickness, and that mostly chills and fever and Pneumonia. Ten births, twelve deaths.

(Signed)

F. P. BULLMAN.

Assessor

ELIZABETH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John W. Whelan, President (City Treasurer), Elizabeth; Wm. A. M. Mack, M. D., 36 Third street, Elizabeth; E. B. Grier, City Physician, 28 Broad street, Elizabeth; E. L. P. Coleman, Secretary, City Hall, Elizabeth; Wm. Birnie, Jr., 210 West Jersey street, Elizabeth; John C. Donahue, 28 First street, Elizabeth; E. G. Putnam, City Hall, Health Inspector.

Same as last year, excepting number of buildings supplied with water, which have increased to 3,372.

Gas, electricity, and naphtholine.

Removed by scavengers to almshouse farm, outside city limits.

A few cases of glanders and pleuro-pneumonia.

Seven public schools and buildings, and one public high-school, occupying a fine brown-stone mansion, presented to the city by Mr. Joseph Battin, besides quite a large number of private schools.

Number of cases of contagious or infected diseases reported: diphtheria, 78; scarlet fever, 146; measles, 251; whooping-cough, 11; chickenpox, 6; varioloid, 1.

Quarantine as well as vaccination enforced on all public-school children.

Under the new scavenger system, viz., contract given to one party, the city has been much better served than in years past; still there are many complaints, but they are getting less every day. The subject of cleansing Elizabeth river is being agitated by the Board of Trade, but lack of funds is an obstacle yet to be overcome. The Board of Health have urged the necessity of sewers in several of the streets in the lower wards, but thus far have not succeeded, except in a few cases. Several applications are now before City Council, and have been referred to Sewer Committee, where they seem to remain inactive. In the absence of any public crematory

for garbage, (or any hope of having any), I am advising all to have a private one for themselves, which can be procured at small expense. Some will invest in them, and we hope they will be generally adopted.

(Signed)

E. G. PUTNAM,
Health Inspector.

FANWOOD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Geo. Kyte, Scotch Plains ; L. W. Miller, Scotch Plains ; Wm. Terry, Plainfield ; John Robson, Scotch Plains ; F. W. Westcott, M. D., Scotch Plains.

LINDEN BOROUGH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alexander R. Corbet, Linden ; Ferdinand Blancke, Linden ; Edward Gulager, Linden ; John A. Etheridge, Linden ; M. C. Lowdon, Linden. Victor Mravlag, M. D., Medical Advisor, Elizabeth. M. C. Lowden, Health Inspector.

The past year within the incorporate limits of the borough with two exceptions has been one of very fair conditions in a sanitary sense.

There have been very few cases of malaria. There were five cases of scarlet fever, three of which were fatal, the disease existing in two families, which by the prompt and energetic action of the parents in using the necessary disinfectants was kept from spreading.

There has been no disease of any kind existing among the cattle at the dairies.

(Signed)

M. C. LOWDON,
Health Inspector.

LINDEN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Metz, President, Tremble Point ; William B. Marsh, Tremble Point ; Thomas W. Leonard, Roselle ; Phillip Shangle, Roselle ; John F. Spinning,

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Roselle ; Benjamin Tucker, Linden ; George A. Benwell, Linden : William S. Rose, Linden ; Dr. Henry C. Pierson, M. D., Roselle.

PLAINFIELD CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George W. Rockfellow, President, Plainfield; Stephen A. Ginna, Plainfield; Lemuel W. Serrell, Plainfield; Geo. W. Endicott, M. D., Plainfield; Oliver B. Leonard, Plainfield, Secretary; M. Marvin Dunham, Health Inspector, Plainfield

The work of this Board the past twelve months has been directed in the line of precautionary action, endeavoring to prevent the existence of accustomed nuisances and thereby promote healthfulness by averting the causes of preventable disease.

The quiet and steady efforts of the Health Inspector in his constant examination of the sanitary condition of premises and his personal requisition for removal of all deleterious substances from houses and yards, have resulted in continued cleanliness and a fair degree of exemption from sickness. There have been five hundred and nine personal inspections from house to house, and one hundred and sixty-three notices served for the removal of nuisances. No epidemics have existed nor any prevalent disease, there having been reported on an average less than one case a week of sickness of a communicable character.

In the city there are 1980 dwelling houses. The corporate limits cover an area of 3,500 acres. More than half the population, about 6,000 people, occupy less than one-fourth of this territory, being the more thickly settled part of Plainfield. The dwellings are usually built with cellars, which are dry, and but few tenement houses exist for more than two families.

The garbage collections have been performed with only partial satisfaction, which the Board expect the coming year to greatly improve. An effort has been made to have occupants of houses provide suitable water tight receptacles for holding kitchen refuse, so as to keep it separate from ashes and rubbish. Housekeepers generally have not yet accustomed themselves to a systematic method of caring for these things that the sanitary code requires. But progress is being made in this direction.

Perhaps no more imperative duty manifests itself to the Board in its regard for the health of the citizens than the absolute necessity of watching strictly the condition of the numerous cesspools and privy vaults within our jurisdiction. The contents of these underground receptacles (which are usually built of stones loosely laid up with open bottom,) are cleaned out and removed by licensed scavengers only. The difficulty of a proper disposal of the emptying is a source of annoyance and dissatisfaction. During the year 796 cesspools and privy vaults have been emptied and cleaned. Especial attention has been given to these important matters for a two fold purpose; that of avoiding the excessive collection of such unhealthy substances which pollute the atmosphere and of preventing their contamination of drinking water in shallow wells near by.

In addition to a constant examination of these underground dangers, a close inspection has been kept of the surface nuisances such as ashes, rubbish, &c. A free use of disinfectants has been made in all cases, whether private refuse, heaps or public dumping grounds have been under consideration and treatment.

The water supply of Plainfield is entirely from wells, mostly tubular driven twenty-five to thirty-five feet in the subterranean gravel, and a few extending into the underlying rock. Occasionally open wells are used, but very seldom. Only four cases of impure drinking water, have been reported, the worst one a shallow well, having for its cause of contamination, the leakage of a street gas main. The effectual remedy was the sinking of the well tube about ten feet further. The City Council is considering the propriety of introducing an artificial supply of water. Plans and general specifications have been submitted by several competing engineers. Before the next annual report is made, it is expected a system of model water works will be in satisfactory operation in Plainfield.

The drainage of the city is altogether of a surface nature. The lay of the land is such that most of the rainfall is carried off by the street grades into Green Brook and Cedar Brook. Extravagant and erroneous reports were circulated this summer of the injury done to property in Plainfield by the heavy rains and giving way of dams in the vicinity. In nearly every instance the damage sustained, arose from people encroaching upon the natural bed of the brook or placing obstructions in the way of the swollen current of the stream. The two water courses have a sufficient descent to

carry off readily any amount of surface drainage, if property owners along their banks would refrain from narrowing the channels and otherwise restricting the natural flow of the water.

There are no sewers of any extent, one in New street, about 2100 feet long, assists in collecting surface water only from an area of several acres. Another in North avenue and Peace street, (1800 feet long) is the receptacle for sewerage matter as well as rainfall. Both discharge into Green Brook. The subject of public sewers for general purposes, has received considerable discussion and examination. A plan has been proposed, which seems the only feasible one for a level area like Plainfield, where there is no tide outlet. It is a dual system of purification of the sewerage and its intermittent filtration through properly graded and underdrained land allowing the effluent to pass off into Green Brook, within the city limits.

There has been a prompt and thorough return of vital statistics, the registration of which by the secretary shows for the twelve months ending October 1, 1880, the following recapitulation; marriages solemnized 98; births attended 214, (being 97 males and 117 females;) deaths occurring 185—being 59 of 5 years and under, 69 from 5 to 60 years and 57 of 60 years and over; still births 5.

(Signed)

OLIVER B. LEONARD,
Secretary.

RAHWAY.

I have nothing new to report from our local Board this year. Our membership and officers are the same as last year.

(Signed)

CHAS. H. LAMBERT,
Secretary.

SUMMIT TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Parker W. Page, Chairman, Summit; Dr Wm. H. Risk, Physician, Summit; Stephen R. Mallen, Assessor, Summit; George Manley, Summit; John H. Pheasant, Summit. J. J. Lane, Health Inspector and Acting Secretary.

Water supplied by wells and cisterns of private owners. On January 1, 1890, expect to have water supplied by mains laid through town by the Commonwealth Water Company, of Newark.

Cesspools of private owners. Water is level. No swamps or malaria. No sewers.

Houses have cellars for storage of coal, wood, etc. Five tenement houses.

Cesspools are cemented, and emptied by public scavenger wagon for the purpose.

Slaughter houses are not permitted in township limits.

(Signed)

J. H. LANE,
Health Inspector.

UNION TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James B. Woodruff, Roselle, Union county; William A. Allen, Hilton, Essex county; John Leonard, Union, Union county; D. Hobart Sayre, Union. Union county.

Have the pleasure of reporting that in this township there has been less sickness this year than usual. The unusual rain fall has been annoying, and created fears of contamination from surface water polluting wells and other sources of water supply, but no sickness is known to have been caused thereby.

There has not been a single complaint brought to the notice of the Board of any nuisance, and but few notices of contagious diseases. Of the latter, none called for any action by the Board, as the parties interested took all proper precaution to prevent the spread of contagion.

(Signed)

D. HOBART SAYRE,
Secretary.

WARREN COUNTY.

FRELINGHUYSEN.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

F. Rorback, M. D., Johnsonsburg; D. J. Howell, Johnsonsburg, D. C. Howell, Johnsonsburg, John V. Allen, Pauling, Township Committee; N. D. Vasbinder, Johnsonsburg, Assessor.

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GREENWICH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Shipman, President, Philipsburg; R. G. Stone, Stewartsville, R. I. Smith, Bloomsbury; Enos Beatty, M. D., Stewartsville. William Sherrer, Secretary.

Nothing special to report,
(Signed)

WILLIAM SHERRER,
Secretary.

HACKETTSTOWN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. J. B. Cook, Hackettstown; Dr. Theo. Crane; Hackettstown; Dr. A. E. Martin. Hackettstown; Wm. M. Errett, Hackettstown; Wm. F. Shields, Hackettstown; Charles N. Wade, Hackettstown; Charles J. Reese, Hackettstown. J. M. Everett, Health Inspector, Hackettstown.

We have a population of 3,500.

Our water supply is pure spring water, which rises on Schooley's mountain, and is brought to the town by pipe. Every one uses it as there are no wells. Last year it was thoroughly cleaned and repaired at an expense of \$1,000. The reservoir is so arranged that no riley water comes through the pipe.

Have no sewers; all drainage is natural.

Our streets are good, yet we expect to have them repaired with crushed stone next year.

• Have some stone and some brick houses; most of them are frame, 2½ stories high. A few of the tenement-houses have more than one family.

Our streets are lighted by electricity; also most of our stores, and all the churches.

Our markets are kept in good condition.

No disease of animals.

The slaughter-houses are kept cleaned.

Have a silk mill, which is running all the time, employing about forty worthy young folks. Sanitary condition good.

Schools are being repaired; cesspools being built, and a new boiler is being placed in position for heating purposes.

Have one policeman.

The seminary is the only building which has fire escapes.

Have had no prevalent disease this year.

(Signed)

THOMAS NOLAN,
Town Clerk.

HARMONY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Roderic Vannatta, Roxbury; J. W. DeWitt, Harmony; Robert Kinney, Harmony; A. K. Cole, Montana. J. D. DeWitt, Health Inspector, Harmony.

The water supply is from cisterns and springs.

The drainage is natural.

The houses generally have cellars, which are largely used for storage of vegetables.

Very few houses are occupied by more than one family.

There are no slaughter houses or manufactories.

The school houses, except one, are new and comfortable.

There are no almshouses or hospitals.

There are four cemeteries; all in good condition and well cared for.

We have had no contagious diseases. Some hooping cough, which has been epidemic in a mild form.

Vaccination is very much neglected.

No sanitary expenses.

Dwellings are heated by stoves, and lighted by kerosene oil.

(Signed)

J. D. DEWITT, M. D.,
Health Inspector.

INDEPENDENCE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. J. Barker, Vienna; Andrew Seimanton, Vienna; Andrew J. Ayers, Hackettstown; John Merrell, Assessor, Danville.

There is no change in description of property or local affairs in this township for the year 1889.

The Board of Health have not been called together during the

year. There has not been any prevalent disease or epidemic in this township.

(Signed)

JOHN MERRELL,
Assessor.

HOPE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Miller, M. D., Secretary, Hope; Edgar C Howell, Hope; George G, Depue, Mount Hermon; John N. Parks, Hope; Alvin A. Van Horr, Assessor, Hope.

KNOWLTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. B. Moore, Columbia; Samuel Bogart, Delaware Station; Jeremiah Hiles, Knowlton; E. Dietrick, Columbia; Robert Bond, M. D., Knowlton.

Water supplied from well and springs principally. Some cistern water used. The water is mostly hard.

No regular system of drainage. The cellars of many of the houses are wet and unfitted for use. There are a few swamps, but malaria is not very frequent.

Houses generally have cellars, where vegetables are stored during the winter. No tenement houses.

Sewers not used. Cesspools built with open bottoms or sides.

Has been no epidemic among animals in the past year, at least I have heard of none. I presume the assessor makes the necessary inquiries.

There are no slaughter houses in the township.

Typhoid fever has been quite prevalent in this and adjoining township during the past summer. It has not been very violent in character, or fatal in termination.

(Signed)

ROBERT BOND, M. D.,
Township Physician.

LOCAL BOARDS OF HEALTH.

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LOPATCONG TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Robert D. Melroy, Chairman, Phillipsburg; Edwin H. Paulus, Phillipsburg; George G. DeWitt, Phillipsburg; Jeremiah Yeisley, Secretary, Phillipsburg, P. O. Box, 439; Lewis D. Bleher, Physician, Phillipsburg.

There has been no change in the township since my last report as regards to its topography, drainage, etc. There have been no contagious diseases. No complaints have been made to the Board of any violation of the laws, and I think the people are beginning to appreciate the working of the health laws in their endeavors to conform with them. On the whole this past year has been one remarkable for freedom from disease of all kind, for which we are devoutly thankful.

(Signed)

JEREMIAH YEISLEY,
Secretary.

MANSFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. S. Apgar, Stephensburg; Nicholas Martenis, Port Murray; Robert M. Thomas, Port Murray; James Beaty, Assessor, Stephensburg.

This township is supplied from springs and wells.

No drainage except natural.

No disease among animals.

One slaughter house kept clean and in good order.

Warren county poor farm is in township and from outward appearance is kept clean and in good order, by the steward, Mr. Hance. There has been no prevalent disease or epidemic during the year.

(Signed)

JAMES BEATY,
Assessor.

OXFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Lommason, Belvidere; John H. Hildebrandt, Belvidere; George A.

Wildrick, Oxford; Charles Wiseburn, Oxford, L. B. Hoagland, M. D., Oxford
No regularly appointed Health Inspector.

The water supply is mainly from wells and cisterns. Some parts of the town of Oxford furnished by water from mountain springs, by means of iron pipes. Water never discolored. Soft. No iron or peculiar taste. The same at all seasons of the year. No sewerage can possibly get into spring. About one-half of population of township depend on wells; one-fourth on cisterns, and remaining one-fourth on springs for water supply.

No regular system of drainage and sewerage. As a rule cellars are dry. Some parts of town of Oxford Furnace cellars are wet, especially houses owned by the Oxford I. and N. Co. These houses are many of them built on swampy ground.

About 400 or 500 acres of swamp land have been cleared and drained near the town of Oxford Furnace, but drainage is insufficient and about one-half of the area reclaimed is flooded with water during heavy rains, and as a consequence malaria is quite prevalent among us.

Houses generally have cellars. Only one family in a house, except in rare instances.

Have no sewers. Uncemented cesspools; generally a hole dug and walled up with loose stone. Generally not cleaned until too full for use then a new hole is dug and the house moved. Old hole then generally covered with dirt, after contents have been treated with lime, etc.

Have had no contagious diseases. All the doctors in the township agree that the past year has been the most healthy for many past.

(Signed)

L. B. HOAGLAND, M. D.,
Secretary,

CHARLES WISEBURN, \
Assessor.

PHILLIPSBURG.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles McClary, President, Phillipsburg; Dr. Brakely, Clerk, Phillipsburg, Dr. Jacoby, Town Physician, Phillipsburg; Isaac Miller, Phillipsburg; George

Flemmings, Phillipsburg; Wilson Carey, Phillipsburg. Samuel B. Burwell, Phillipsburg, Health Inspector.

Phillipsburg is situated on the banks of the Delaware river; population between 10,000 and 11,000; climate is temperate.

It is very hilly.

Water-works, supplied from a large spring, connected also with the Delaware river.

Good drainage; two sewers recently constructed.

The streets are in fair condition.

Tenant-houses are well kept up.

Gas and coal oil used.

No public markets.

Some hog cholera has existed.

Good police and two lockups.

Diphtheria and scarlet fever have prevailed during the year.

(Signed)

SAMUEL B. BURWELL,
Inspector.

POHATCONG TOWNSHIP

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. A. Boyer, Secretary, Finesville; Chas. Shaner, President, Springtown; Davies Frace, Shimers; Jacob S. Wider, Finesville; Nathan Case, M. D., Health Inspector.

Pohatcong township lies on the Musconnetcong and Delaware rivers, with Greenwich on its east and Lopatcong on its north. Climate is healthful. Population about 1,000.

Our water supply is from wells, cisterns, and springs.

No drainage.

No public grounds.

Houses mostly frame, two and a half stories.

No markets.

No diseases among animals.

No slaughter-houses.

Two paper mills; four stores.

Four schools; two churches.

One cemetery.

No prevalent diseases during the past year.

(Signed)

J. A. BOYER,
Secretary

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. M. Stiles, M. D., President, Washington; John Cushing, Secretary, Washington; John Hornbaker, Washington; Geo. Dawes, Washington; Geo. Campbell, Washington; Levi Bowlby, Washington. F. P. McKinstry, M. D., Health Inspector, Washington.

We have nothing of special interest to report in regard to the work of the Board of Health during the past year.

There has been no epidemic and very few cases of contagious diseases.

The Board has been instrumental in abating a number of minor nuisances.

Our citizens generally are disposed to aid the Board in its work and to comply with our demands.

(Signed)

F. P. MCKINSTRY, M. D.
Assessor

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Castner, Chagewater; Peter Weller, Chagewater; Wm. Apgar, Port Colden; Wm. Miller, Hampton, Inspector.

Washington township has not made any progress in the matter of water supply or drainage, having cisterns mainly as the water supply; drainage allowed to run on open ground or in an old barrel sunken in ground. Houses invariably have cellars. Very few basements. The cellars are very often used as storage for vegetables for winter supply. The past year has been unusually healthy,

free for the most part from usual prevailing diseases. One case of typhoid fever was reported about September 1st, have heard of no other up to date.

(Signed)

WM. MILLER,
Secretary.



LAWS AND CIRCULARS.

LAWS OF 1889.

Chapter XV.—A Supplement to and act entitled “ An act to establish in this State boards of health and a bureau of vital statistics, and to define their respective powers and duties,” approved March thirty-first, one thousand eight hundred and eighty seven.

Chapter XXIV.—An act to protect the title of veterinary surgeons and to regulate the practice of veterinary medicine and surgery in New Jersey.

Chapter LIV.—A supplement to an act entitled “ An act to provide for drainage and sewage in densely populated townships in which there is a public water supply,” approved March fourth, one thousand eight hundred and eighty-four, and the various amendments thereto.

Chapter XCII.—A further Supplement to the act entitled “ An act concerning marriages, births, and deaths,” approved March twenty-seventh, one thousand eight hundred and seventy-four.

Chapter XCIII.—Supplement to an act entitled “ Supplement to an act entitled ‘ An act to provide for drainage where the same is necessary to the public health,’ approved March twenty-fourth, one thousand eight hundred and eighty-one,” and which said supplement was approved April twenty-third, one thousand eight hundred and eighty-eight.

Chapter CXXV.—A Further Supplement to an act entitled "An act providing for sewerage in and by adjoining cities, towns, and townships," approved April twenty-first, one thousand eight hundred and eighty-seven.

Chapter CXLVIII.—An act to provide for street and sewerage improvements in the cities of this State, without increase of municipal indebtedness therefor.

Chapter CL.—A Supplement to an act entitled "An act to provide for sewerage and drainage by incorporated camp-meeting associations or seaside resorts," approved March fifth, one thousand eight hundred and seventy-eight.

Chapter CLXVI.—A Further Supplement to an act entitled "An act to regulate the practice of medicine and surgery," approved March twelfth, one thousand eight hundred and eighty, and the supplement thereto, approved March twenty-second, one thousand eight hundred and eighty-three.

Chapter CCXLV.—A Further Supplement to an act entitled "An act to authorize cities to construct sewers and drains and to provide for the payment of the costs thereof," approved March eighth, one thousand eight hundred and eighty-two.

Chapter CCLVI.—A Further Supplement to the act entitled "An act to establish in this State boards of health and a bureau of vital statistics, and to define their respective powers and duties," approved March thirty-first, one thousand eight hundred and eighty-seven.

Chapter CCLXVIII.—An Act to amend an act entitled "An act to authorize the incorporation of rural cemetery associations and regulate cemeteries" [Revision], approved April ninth, one thousand eight hundred and seventy-five.

Chapter CCLXIX.—An Amendment to an act entitled "An act to authorize the incorporation of rural cemetery associations and regulate cemeteries" [Revision], approved April ninth, one thousand eight hundred and seventy-five, and the supplement thereto,

approved March twenty-fifth, one thousand eight hundred and eighty-five.

LAWS GOVERNING BOARDS OF HEALTH.

The principal laws governing Boards of Health are to be found in Circular LX, Circular LXV and Circular LXVI of this Board. As usual we give a list of all laws passed by the last Legislature relating to subjects in any way collateral to the work of health boards. Two laws of especial importance were passed. The first is that of Chapter XV, Laws of 1889, and is as follows :

CHAPTER XV.

A Supplement to an act entitled "An act to establish in this State Boards of Health and a Bureau of Vital Statistics, and to define their respective powers and duties," approved March thirty first, one thousand eight hundred and eighty-seven.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That local boards of health in densely populated townships, in which there is a public water supply, shall, in addition to the powers enumerated in the act to which this is a supplement, have power to pass, alter or amend ordinances and make rules or regulations within their respective jurisdictions.

I. To compel, prescribe, regulate and control the plumbing, ventilation and drainage of all buildings, public and private, and the connection thereof with outside sewers, cesspools or other receptacles, and to require plans for the same, with necessary drawings or descriptions, to be submitted to said boards for inspection and approval, and to require all master and foreman plumbers and all building contractors to register their names and addresses at the office of said board.

II. To secure the sanitary condition of all buildings, public and private.

2. And be it enacted, That any such Board of Health may, by resolution, delegate any portion of its powers to any member of the board, or to any officer thereof, to be exercised only when the board is not in session, and any notice by any member of the board,

or by any officer thereof, shall be noticed by the board, and the person served therewith shall be bound thereby.

3. And be it enacted, That this act shall take effect immediately.
Approved February 25, 1889.

The next is chapter 256, laws of 1889, and reads thus:

CHAPTER CCLVI.

A Further Supplement to the act entitled "An act to establish in this state boards of health and a bureau of vital statistics, and to define their respective powers and duties," approved March thirty-first, one thousand eight hundred and eighty-seven.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That all local boards of health shall, in addition to the powers now vested in them, have power to pass or amend ordinances and rules within their respective jurisdictions; to license and regulate persons to engage in the business of cleaning cesspools and privies; to fix the fees that shall be charged for each license granted, not exceeding twenty dollars for each vehicle or conveyance; to prohibit unlicensed persons from engaging in said business, and to require all vehicles and conveyances used in said business to be approved by the local board of health of the jurisdiction in which the same may be used.

2. And be it enacted, That each license granted under the provisions of the foregoing section shall continue for the term of one year from the date of granting the same; provided, that if any person licensed as aforesaid, or any of his employes, servant's or agents shall violate any ordinance or rule of said board in cleaning any cesspool or privy, or in removing the contents thereof, such license may, in the discretion of the board which granted the same, be revoked by said board.

3. And be it enacted, That all local boards of health, except township boards of health, which now have or may hereafter pass an ordinance or ordinances, under the power now conferred by law, requiring that the plan of the plumbing or drainage system to be constructed in any building within their respective jurisdictions, shall be filed in the office of the board of health, shall have the power to charge a fee not exceeding two dollars, to be paid by the owner or other person filing said plan to the said board of health on filing said plan.

4. And be it enacted, That this act shall take effect immediately.
Approved May 9, 1889.

The latter law is construed to include scavenging in general but might be aided by a more explicit amendment. It can be said that we now have a legislative code of health laws as perfect as furnished by any other state of the Union. There may be need of occasional addition, but the chief duty is to protect the present system from careless amendment or unnecessary addition. This is all the more important because the constitutionality of most of the present laws has been affirmed by the higher courts.

LAWS RELATING TO HEALTH; OR, INCIDENTAL THERE TO.

(Passed by the Legislature of 1889.)

An important law was passed by the last Legislature, regarding the marriage of Minors. It affords greater security to parents, and to those who perform the ceremony, and serves as a caution against hasty marriages. It is as follows:

CHAPTER XCII.

A Further Supplement to the act entitled "an act concerning marriages, births and deaths," approved March twenty-seventh, one thousand eight hundred and seventy-four.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That the third section of the act to which this is a supplement be and the same is hereby amended to read as follows:

3. And be it enacted, That no justice of the peace, minister of the gospel, or other person having, or pretending to have, authority to join persons together in the holy bonds of matrimony, shall marry any male under the age of twenty-one years, or female under the age of eighteen years, unless the parent or parents, guardian or

guardians, or person or persons under whose care and government such minor or minors shall be, be present and give consent thereto, or until the minor applying to be married, whether male or female, shall have produced a certificate of consent, in writing, under the hand of the parent or parents, guardian or guardians, or if such minor so applying to be married have no parent or guardian, then under the hand of the person or persons under whose care and government he or she may at that time be, and if any certificate be produced as aforesaid, the same shall be proved to be genuine by the oath or affirmation of at least one person, of full age and discretion, who was present at the signing of the same, and affixed his or her name as a witness thereto, which oath or affirmation may be administered by any justice of the peace, minister of the gospel, or other person authorized to solemnize marriages as aforesaid, and shall be entered upon the back of said certificate of consent; and if the person called upon to solemnize any marriage shall suspect that any male applying to be married is under the age of twenty-one years, or that any female applying to be married is under the age of eighteen years, and no consent of the parent or parents, guardian or guardians, or person or persons under whose care and government such male or female may be, shall be obtained as hereinbefore directed, he shall administer to such male or female, or both, as the case may require, an oath or affirmation that such male is of the full age of twenty-one years, and that such female is of the full age of eighteen years, which oath or affirmation shall be entered upon the back of the certificate of marriage required by law to be made by the person solemnizing such marriage, and shall be his justification should the parties so married, or either of them, deceive him as to his or her age.

2. And be it enacted, That the fifth section of the act to which this is a supplement be and the same is hereby amended to read as follows:

5. And be it enacted, That every justice of the peace, minister of the gospel, or other person having, or pretending to have, authority to join persons in marriage, who shall marry any minor or minors by virtue of a certificate of consent had and proved as above directed, shall register the same, or cause it to be registered, in a book by him to be kept for the purpose of registering marriages, and shall attach the original certificate of consent to the certificate

of marriage by him required to be made, and shall transmit the same, with said certificate of marriage, to the officer to whom by law he is required to transmit the certificate of marriage, to the end that the same may be forwarded to and filed with the State bureau of vital statistics.

3. And be it enacted, That this act shall take effect on the first day of May, one thousand eight hundred and eighty-nine.

Approved April 1st, 1889.

The following list gives reference to all laws especially relating to Public Health or Incidental Hints, as passed by the Legislature of 1889:

Thus far LXX circulars have been issued by the board covering almost every subject of practical sanitary administration. Many of them had reference to some special period or service, and so have not needed report. In other cases two or three circulars have been combined into one with such addition as the progress of knowledge made necessary.

The circulars now kept on hand by the board for distribution are as follows:

Circular VII. As to the protection of bathers.

XIX. Schedules for institutional sanitary injury.

XXVII. As to sanitary instruction and training in schools (1).

XXVIII. Sanitary school circular (2).

XXIX. As to charitable and penal institutions.

XXX. As to sanitary survey and topography.

XXXVII. School and health circular (3).

XXXIX. To local Boards of Health (what they may do).

XL. Health of operatives (1).

XLI. Health counsels for working people (2).

XLII. As to petroleum, kerosene, etc.

XLIV. Prevention of small pox, scarlet fever, diphtheria, etc., as to vaccination.

XLV. Circular as to cholera.

XLVI. October circular with annual report blank.

XLVII. Prevention of serious injuries to the mind, the eyes, the ears.

Circular L. Combined circulars as to contagious diseases of animals.

LII. Plan of sanitary inspection of houses and premises.

LIII. Pure drinking water. How to secure it.

LV. October circular with annual report blank.

LVI. Sanitary inspection of school houses (inspection blank.)

LVII. To the physicians of the State, as to typhoid fever and diphtheria.

LIX. Laws relating to adulteration of foods and drugs and to petroleum.

LX. Health law of 1888 and references to other laws.

LXI. Care of household wastes.

LXII. Drainage for health.

LXIII. Farmers' homes and their perils.

LXIV. Disinfectants and how to use them.

LXV. Construction, plumbing, ventilation and sewerage of buildings (plumbing ordinances).

LXVI. Laws as to vital statistics (marriages, births and deaths).

LXVII. To funeral directors and all having in charge the care and burial of the dead.

LXVIII. To local boards of health (spring circular).

LXIX. Meat supply. How to guard it.

LXX. As to health laws, inspector, etc. (occasional health bulletin.)

The last three have been issued this year and are as follows :

CIRCULAR LXVIII.

OF THE

STATE BOARD OF HEALTH OF NEW JERSEY.

TO LOCAL BOARDS OF HEALTH.

It is both a privilege and a responsibility to be a member of a Local Board of Health ; a privilege because it enables you to do

much to prevent disease, and a responsibility because we have the evidence that neglect on the part of local boards has often caused a greater prevalence of sickness and the spread of epidemics. We find now and then a board that sees nothing to do. And then, again, a board in a locality very similar that does do much in removing the causes of disease or in diminishing the number of cases that occur.

This State has plain, excellent and ample laws, giving large powers to Local Boards of Health for preventing or abating nuisances, and in other ways guarding and promoting the health of the people.

In Circular XXXIX we have indicated the many ways in which these Boards can be useful.

City, township and borough boards are formed in accord with the methods prescribed in the law as to such boards. Township boards consist of the township committee, the assessors and such physicians as may have been selected. While the township board can act without a medical member, it is always important to have one. If no one is chosen by the local board, the State Board generally exercises its right to place one upon it.

While the law by its terms forms the local board, it is best that it should organize as such and keep some record of its work. In our IX Report, page 283, is to be found a code of ordinances, which will serve as a model for these boards.

It is always best for townships to pass ordinances as to health, since then the people understand what is required, and it is easier at once to collect a fine for disobedience of an ordinance than it is to abate a nuisance and then collect the expense from the offending party. This board will give full information as to how to pass and carry out ordinances, or will send, without expense, a Health Inspector to give any needed directions.

Many of the townships, as well as the cities, need a Health Inspector, care being taken that he not only helps to abate evils to health, but to prevent them. In all villages there should be inspection of premises. An Inspector should always give a brief, written report of the visits he has made and of the work he has done. The law makes provision for his payment.

While the membership of a Board of Health is of the nature of that of a Board of School Trustees, it is proper that all expenses

and all extra services of any member of such boards should be paid for.

Experience is constantly illustrating how necessary such boards are and how their importance is recognized, especially in times of epidemic.

Each spring the Health Board should carefully consider any causes injurious or hazardous to health, and the need of examination as to the condition of houses or neighborhoods. We have cases where Assessors, interested in the public health and having informed themselves as to sanitary matters, have been of great service by their inquiries and advice as they go around to make their assessments.

In cities the boards need to be fully informed as to the existing evils, and to apply the law as to the inspection and plumbing of buildings.

Both in city and country great attention needs to be given as to cases of diptheria and typhoid fever, as well as to other communicable diseases. Prompt isolation of cases of diptheria, scarlet fever, etc., and intelligent inspection would do much to prevent the spread of these diseases in schools and families, and thereby prevent sickness and death.

We always send our reports to the Assessor for the use of the board, and are glad to send Circulars or Reports as far as we can to other members of the board.

Those who read the printed matter that is furnished will not be in doubt as to what is asked of them in proper guard of the public health.

Often much good is done by the distribution of the Circulars of this board among the people. We thus not only ask your aid in this good work of caring for the health of the people of your community, but commend it to you as a matter in which the State has placed you as overseers, in a position to be of great service.

EZRA M. HUNT, M. D.,

Secretary of State Board of Health of New Jersey.

We also reprint Circular LXIX as it has several changes.

CIRCULAR LXIX.

NEW JERSEY STATE BOARD OF HEALTH.

MEAT, POULTRY, GAME AND FISH AS FOODS, AND HOW TO JUDGE OF THEIR QUALITY.

The value of this class of foods is recognized by most, and it enters very largely into the dietary of the people. While believed to be indispensable for the best working life, there are many who use meat to excess. It is to be remembered that the same material is found in beans, peas and other vegetables, and that it is possible without it, in some form or other, to supply all necessary food.

So important an article of food, however, must be guarded as to its quality with the greatest care.

The slaughter of cattle, sheep and swine should be where there can be skilled inspection.

Public abattoirs are of great service in this regard. Cities could easily have regulations and inspectors, so that no meat could be sold that had not been inspected at time of killing. Market inspection can not take the place of this. Yet markets need inspectors also, in order to secure the proper condition of meat at the time it is offered for sale.

Meat of poor quality or that is from diseased animals, even if it does not cause any disease, has a reduced food value. Sometimes it occasions fever, loss of appetite, diarrhœa, or skin eruptions and boils.

Of recent years the relations of animal and human diseases have been more fully established, and many are now recognized as communicable to mankind. About fifty human ailments are claimed to have, under possible circumstances, an animal source. In other cases the similarity is very marked. All such facts show that as we depend so largely upon flesh as a food supply, we should provide to secure a healthy quality of it. In visiting foreign abattoirs and markets we found, as a rule, much greater care exercised than in this State.

Dr. Francis Vacher, the medical officer of health for Birkenhead, opposite Liverpool, has been long identified with such inspection, and, as we know from personal visitation with him, has given great attention to the subject of meat supply. The rest of this circular will give, in condensed form and with slight changes and additions, the directions he has given as to the examination of Live Animals, Carcasses, Meat, Fish, etc.

MEAT.

Good meat is firm and elastic to the touch, moist but not wet, and except in the case of pork, veal and lamb, bright red in color. It has also, if well-fed, a somewhat marbled appearance from small layers of fat in the muscles. It has a fresh, not disagreeable smell. To test this, an iron or wooden skewer should be thrust into the centre and rapidly withdrawn and smelt. The meat-juice should slightly redden litmus paper, showing that it is faintly acid. The fat should contain no watery juice or jelly, and should be free from blood stains; the suet fat should be hard and white. In salt meat the brine should not be sour.

CARCASSES.

A sound, healthy carcase should be well-set as soon as it is thoroughly cool; it should also be well-bled, no part of it being purple, brown, or speckled. One side or quarter should not be darker than the rest. It should not be bruised, nor bile-stained, and not markedly attenuated. The muscle on being pressed with the fingers should not "pit," as this would indicate the presence of water, and should not "crackle," as this would indicate the presence of air.

In place where carcases are inspected the offal also (that is the head, feet, hide, and all the internal parts except the kidneys*) should be submitted for inspection. The mouth and tongue should be free from blisters and blotches, the hoofs should be firmly

*The head, feet, and skin of a pig form part of the carcase: the offal being only the internal parts, less the kidneys.

attached to the feet, the hide should be free from sores and pimples. The lungs should be of a bright pink color and spongy, free from cavities, pus (matter), or worms. A portion cut off should float in water. The heart should be free from bile-staining blotches. The liver should be of a rich brown color, should not break down easily under pressure, should be free from abscesses (collections of matter) and from flukes. The spleen or melt should be of a dark color inside, grey on the outside, thin and long, and sharp at the edges. The stomachs should not be inflamed, the lining should not readily rub off, and should not smell of drugs. The bowels should have a smooth, uninflamed lining, and should be free from blotches or ulcers (surface sores).

LIVE ANIMALS.

It will not often happen that a sanitary official is called upon to examine live animals. However, he may sometimes have to do so a short time previous to their slaughter. The animal should be well nourished, able to rise without difficulty and so walk without lameness. Its coat should be in good condition, its skin supple, and without sores, scabs or boils. Its eyes should be bright, its mouth and nostrils moist but free from discharge. It should breathe easily, almost noiselessly, and its breath should be without odor. It should not shiver or give any indication of being in pain.

MEAT UNFIT FOR FOOD.

In examining meat it should be borne in mind that there are three conditions owing to which it may be unfit for food, viz.:

1. It may be partially decomposed through having been kept too long.

2. It may be derived from an animal which has died a natural death, or only been slaughtered when in a dying state.

3. It may be derived from an animal affected with a disease, either communicable or in some other way injurious to man, or from a poisoned animal.

1. *Partial decomposition* is shown mainly by the characteristic smell. The meat, too, loses its elasticity, is soft, and tears readily. On cutting, the resistance offered to the knife varies, some parts being softer than others. The cut surface often swells from a kind

of fermentation or "heating." The outside is pale and livid, at a later stage greenish. Litmus paper is not reddened, but remains neutral, or indicates the juices are alkaline.

2. *Meat from animals which have not been killed or only killed when moribund*, is dark in color, often purple. The meat sets badly, is full of blood, neutral or alkaline, and readily decomposes. The flaying and dressing of such animals is usually done under unfavorable circumstances, and often by no expert hands, so that the carcase looks hacked and blood-stained and untidy.

3. *Meat from animals affected with disease and thus injurious to man*.—The detection and seizing of such meat is one of the most trying duties of sanitary officers. Determining whether meat is sound or decomposing, or whether it is well bled or has the blood in it, are comparatively simple matters, and not beyond the intelligence of most housewives; but judging whether meat is from a diseased animal, the nature of the disease, and whether it affords warrant for the seizing of the meat will tax the officer's capacity to the full. There are three things he should do to prepare himself for this work: first, he must acquire the necessary knowledge; next, he must train himself to observe closely; and, thirdly, he must cultivate the judicial faculty so as to be able to interpret rightly what he sees.

DISEASES OF ANIMALS WHICH RENDER MEAT UNFIT FOR HUMAN FOOD.

What then are the diseases ordinally met with or likely to occur in home-bred or imported animals which should be regarded as rendering the meat unfit for the food of man?

In *oxen* and *sheep*: Cattle-plague, epizootic pleuro-pneumonia, anthrax and anthracoid diseases, tuberculosis and sheep-pox.

In *swine*: Typhoid fever, epizootic pleuro-pneumonitis, anthrax or anthracoid diseases,* quinsy, and two diseases known by the presence of parasitic worms, cysticeri and trichinæ.

*Some able authorities deny the existence of true anthrax in swine. Whether they do so rightly or wrongly may depend on what they mean by true anthrax. This is no place for giving a scientific definition or arguing a vexed question in pathology. That swine are subject to a disease closely resembling anthrax no one will dispute.

Besides these there are other diseases which depreciate the quality of the meat, render portions of the carcase unfit for food of man, or in their later stages unfit the whole carcase for food of man. These may be set down as foot-and-mouth disease, hoof-rot, pearl disease or tuberculosis, dropsy, liver-fluke.

Of these five, foot-and-mouth disease is the only one which affects swine almost as extensively as sheep or oxen. Liver-fluke is mainly a sheep disease, and hoof-rot almost entirely so.

PLEURO-PNEUMONIA.

Epizootic pleuro-pneumonia, otherwise called lung-plague, is of most importance as a disease of oxen. The only thing noticeable about the meat is that it usually looks dark and ill-bled. The lining of the chest will probably be thickened and roughened, and also the covering membrane of the lungs. The principal changes are in the lungs themselves. Early in the disease the color of the lungs is in great part grey, with red or purple patches or spots, and the lungs are less spongy. Later, the lungs are darker in color, and growing solid, like liver. At this stage the lungs will sink in water, and the weight is much increased—from 7 to 8 lbs. to 30 lbs. or more.

The most obvious symptoms in the live animals are the labored breathing and the evidence of pain. There is often a large quantity of water in the chest, quite sufficient to distend it to an extent certain to attract notice.

In the pig, besides the change in color and density of the lungs, the intestine is often inflamed and marked with dull patches, and parts of the skin are reddened, especially under the belly.

ANTHRAX.

There are three forms of anthrax and anthrax-like diseases. In one, probably the least common, large boils are the most obvious symptom, and will be recognized without difficulty. In another form of the disease, called *black-quarter* or black-leg, one of the forequarters or hindquarters is dark in color and more or less swelled. This also, is easily recognized. Although the disease appears to be restricted to one-quarter, the whole carcase

should be seized. A third form of the disease is *splenic fever*, probably the same as Texas fever. The meat is darker than it should be, and the whole carcass is bile-stained. The liver is nearly always enlarged and somewhat softened, and the lungs are generally inflamed. But the most characteristic symptom is the enlargement of the spleen—the increase in an ox being from about 3 lbs. to 7 lbs. or 10 lbs. Note, also, the rounded edges of a spleen thus affected. The meat is often dropsical, and water is frequently poured out between the lobes of fat in which the kidneys are imbedded.

An ox or sheep affected with the disease is dull and very thirsty, often sore to the touch, and breathes uneasily. If it has black-quarter it will be lame, and the swelled part may crackle on pressure. Sometimes splenic fever takes the form of apoplexy, and the animal may fall down and die almost without warning. What is called *braxy* in sheep is splenic apoplexy. The meat is remarkably dark and sometimes dropsical, and the spleen is increased in weight from 2 or 3 oz. to 5 or 6 oz., or more. When attacked the sheep staggers, stretches out his head, and breathes rapidly.

The carcass of a pig affected with anthracic disease is livid or red over much of the surface, and the meat is sodden and darker in color. There may be dark or blood-colored blotches on the intestines or heart. The spleen is enlarged, as in the case of the ox and sheep. The disease may affect the pig as apoplexy.

SHEEP POX.

Sheep-pox is a disease not often seen in animals submitted for inspection. The eruption, when first it comes out, resembles flea-bites. These become solid pimples, in which a clear fluid soon forms, and then the fluid changes into pus. The pustules are larger than in the human disease, and they sometimes run together. The eruption may appear in the mouth. In the lungs may be found little collections of matter. The wool comes off readily. In the early stage the disease might not be recognized, flea-bites being the only obvious symptom. Later, the flesh becomes soft, pale and dropsical. After pus has been formed there can be no mistaking the disease. Except in the early stage of sheep-pox the meat has a disagreeable odor.

JOINT-ILL OR JOINT FELON.

Animals affected with acute rheumatism—joint-ill or joint-felon as it is called—will commonly attract attention by their lameness or their inability to rise. The joint or joints so affected contain a clear fluid; sometimes there is pus in or around diseased joints. Abscesses (collections of pus) may form at some distance from the joints attacked. The meat is often dropsical. If the animal has been unable to get up for some time, the side on which he lay will look red and inflamed.

PLEURO PNEUMONITIS OF SWINE,

otherwise called Hog-cholera or Swine Plague, does not necessarily produce any marked changes in the meat. The skin, however, rarely escapes affording some indication of disease. There is general or patchy redness (red soldier), or there are large livid blotches (blue disease,) or there is an eruption resembling small-pox, pus being secreted and crusts forming, as in human small-pox. In cases where the pig is "soldiered," the redness is not limited to the skin, but the fat beneath is reddened right down to the flesh. The intestines are often inflamed and marked with red spots, and characteristic spots appear in the large gut (chitlings), and less frequently in the small gut. These vary in size, from mere points to three-quarters of an inch across. In the ulcers ochre-colored crusts form, convex or cup-shaped, and these in time fall out. The lungs are commonly congested, and may be in part solidified. These are the main symptoms, but there may be intestinal ulcers without lung disease, and with little discoloration of the skin; and, on the other hand, there may be a very pronounced skin eruption, and scarcely any traces of the disease elsewhere. Butchers sometimes rub salt along the edges of the reddened fat to remove the color, but an edge so treated can be easily removed with a knife. Of course when the skin eruption is so marked as to resemble bad small-pox, it is not probable that the carcass would be brought into the market. The meat is unfit for food.

In life the main symptoms of this disease are the skin eruption, diarrhoea, and difficult breathing or coughing.

QUINSY IN SWINE.

Quinsy in swine, known also as "strangles," is characterized by swelling in the neck and sore throat. The swelling may extend into the forequarters. The throat is dropsical, and sometimes part of the inside mortifies. The skin around the throat will be red or livid, and there may be an eruption in the mouth. The main symptoms during life are the swelling, labored breathing, and the refusing of food.

WORMS AFFECTING SWINE.

Of the two kinds of worms to be looked for in pork, the larger, *cysticerci*, are much more common and easily detected. They look like little bladders of water, and occur in the flesh between the fibers and often on the surface. The bladder is egg-shaped, and generally from one-eighth to three-eighths of an inch in length. Specimens from the same animal usually vary in size but slightly. The bladder is semi-transparent, containing a clear fluid and what looks like a little white ball. Transfer one of the bladders to a slip of glass, prick it with the point of a knife, and press another piece of glass on the top. Examine this with an ordinary pocket-lens, and observe the head or sucker of the *cysticercus*, surrounded with a circlet of hooks. Once seen there is no possibility of mistaking it. Pork infested with these worms is called measly, owing to the curious appearance of the flesh on section. Quite young pigs may manifest the disease; indeed, they are probably specially susceptible. When pork is a little dry from exposure to air, the bladders may shrink so as to be hardly seen. In such a case a small portion should be soaked in water. The salt in salted pork tends also to dry up the bladders. In examining a live pig to see if he is measled, search should be made beneath the tongue, when often the little bladders can be felt or seen. The bladders may also be found in the loose folds under the tail. Swine affected with this disease are often swelled around the shoulders, but commonly there is no marked external sign indicative of the disease.

The second kind of worms infecting pork, *trichinae*, can be seen on close inspection. The meat looks speckled. The little white

specks seen come out clearer if a very thin shaving of the pork be placed on a glass slip and soaked for a short time in a weak solution of caustic potash. The bladder or shell containing the worm is not placed between the flesh fibers, but actually in a fiber, causing a lemon-shaped swelling. If the glass slip be held up to the light and examined with a powerful pocket-lens, the coiled up worm, fine as a hair, will be seen. If the inspecting officer has access to a microscope, of course this (using a one-eighth objective) will define the parasite better. Sometimes the white specks feel gritty from the presence of carbonate of lime, &c. Swine affected with this disease may present no noticeable symptoms during life. To test them a morsel of flesh is sometimes removed from under the tongue, and a section examined with a lens.

HOOF-ROT IN SHEEP.

Hoof-rot, which is a not uncommon disease among sheep, may in some cases be mistaken for foot-and-mouth disease. It consists in inflammation of the soft parts of the foot, and may lead to shedding of the hoof or even to disease of the bones of the foot. Usually a thick chessy matter collects over the affected skin; sometimes small blisters or pimples may be seen. The flesh looks wholesome, and is so. Except in rare instances, when the inflammation extends into the carcase, all may be passed except the feet. An animal affected with the disease is lame, and losses condition.

TUBERCULOSIS, PEARL DISEASE, OR "GRAPES."

Pearl disease, called also tuberculosis consumption, or (among butchers and dealer) "the grapes," is a common disease of oxen, and less frequently of sheep. The little round tumors, or "pearls," hardly seen when commencing, but growing to the size of a pigeon's egg, occur on the inside of the walls of the chest and on the surface of the lungs. Sometimes the glands about the neck, or the glands in connection with the intestines, are enlarged. On cutting open one of the pearls, its contents are found to be a thick chessy matter, either of the same consistence throughout, or the center may be softened or gritty.

The cheesy matter cream-colored, grey, or yellowish. Portions of the matter may be deposited in the liver. In life there are not always superficial signs to indicate that an animal is suffering from this disease. The animal probably has a cough, but this is not necessarily due to pearl disease; and there may be no appreciable loss of condition. The disease is very common, especially among the occupants of town cowhouses. When the disease is declared, and there are distinct cavities in the lungs and pus in the glands, and much waisting and dropsy, the whole carcase should be regarded as unfit for human food.

Dropsy is not, properly speaking, a disease, but a symptom of many diseases. It may be due to disease of the heart, liver, or kidneys, and to other causes. Sometime the water is limited to the chest or abdomen, and in such cases it does not warrant the condemning of the carcase. When, however, the water is poured out into the muscles and between them, making the flesh sodden and wet, the carcase may be seized as unwholesome. Such meat keeps badly, and has occasionally a faint urinous smell.

"ROT" IN SHEEP.

The most widespread of sheep diseases due to parasites is that popularly known as "the rot." The cause of the disease is the presence in the bile-ducts of the liver of flukes—little animals in shape like a sole. Though flukes are not infrequently found in oxen, they do not occur ordinarily in such numbers as to produce serious disease. The fluke is furnished with a sucker by which it attaches itself. This parasite when once seen will always be recognized. It usually measures from an inch to an inch and a half in length, and is about three-eighths of an inch wide. Flukes are often so closely packed in the bile-ducts as to block them up, and the pressure of them causes the ducts to stretch or burst, portions of the liver being broken down or destroyed. The symptoms of the disease presented by the carcase are jaundice (bile staining), dropsy and emaciation. These three indications that the carcase is really "rotted" undoubtedly warrant its seizure as unsound; but the presence of a few flukes in the liver does not of itself prejudice the carcase, and affords no sufficient reason for seizing it. Even in cases where there is some jaundice and

falling off in condition, the carcase may pass. When seen alive it will be noticed that the animal is sluggish in its movements, yellow in the eyes, is thin or swelled with dropsy, and its wool easily comes out.

It is well here to mention a parasite occasionally found in the lungs of sheep, calves and oxen—the *filaria*. It is a thin worm from half an inch to three inches in length. Inflammation of the lungs, resulting from the presence of these worms, or from cold, is not a serious disease from the meat inspector's point of view, and does not prejudice the flesh of the carcase. The common and fatal disease, *sheep scab*, usually disfigures the carcase so much that it is not offered for sale.

CARCASES OF PARTURIENT ANIMALS.

Carcases of animals which have been slaughtered immediately before, during or after calving or lambing are frequently submitted for inspection. There is certainly no reason for condemning these indiscriminately. If there are indications of apoplexy or milk-fever (*i. e.* the carcase ill-set, meat pale or livid and wet to the touch, etc.,) it is safe to make the seizure. When, however, the slaughtering is due to some complication in connection with calving or lambing, the case is different. There has been uncontrollable bleeding, the calf-bed has come down and cannot be retained in position, or the calf has become jammed and cannot be extricated, &c.; in such casualties there is nothing to prejudice the meat, and if the animal has been properly killed and bled it may be passed. The same rule holds good with reference to other accidents; a blow or a fall, choking, the paunch being packed, &c.

CARCASES OF POISONED ANIMALS.

Flesh manifesting no indications of disease may be unwholesome owing to the animal from which it was derived having been poisoned. In such a case the intestines will not improbably be inflamed throughout (of a bright red color and with red spots). The stomach, especially the first stomach, should be examined for signs of inflammation, and carefully searched for traces of

bryony, meadow saffron, yew leaves, &c. Carcasses of animals maliciously poisoned may also be brought to market. Here the poisoning would probably be a mineral irritant, producing more marked inflammation of the stomach and intestines.

IMMATURE VEAL OR "BOB VEAL," ETC.

It is generally held that immature veal is unwholesome, and yet it is somewhat difficult to state the precise age at which veal becomes mature. A calf born in good flesh and health and old enough to have fully established its new circulation, to be rid of all previous intestinal contents, and to have fed for two weeks, is generally passed in foreign markets. Decision should rest on the appearance of the carcass rather than on any assumed age. To prevent, however, the use of "slink meat," or calves or lambs cast prematurely or dying during birth, there should be a limit of age; but the examiner should not pass poor veal at any age.

POULTRY, GAME AND FISH.

POULTRY.

Good poultry should be firm to the touch, pink or yellowish in color, should be fairly plump, and have a strong skin. It has a fresh, not disagreeable smell. Stale poultry loses its firmness, becomes bluish in color, green over the crop and abdomen, the skin readily breaks, and the bird has a disagreeable odor.

Poultry suffer much from roup, characterized by an offensive discharge from the nostrils and eyes, from gapes, (worms in the windpipe), from intestinal worms, from so-called diphtheria, and many other diseases; but if the bird has been properly killed it may be passed. The only serious disease of poultry there is reason to believe may prejudice the flesh, so as to make it unfit for food of man, is *fowl cholera*. However, there is little evidence of the disease on birds carefully prepared for the market. The flesh is somewhat redder than naturally, the liver probably softer and the heart speckled with red or dark spots often inside and out. If the intestines can be seen they will be inflamed, with red spots or livid patches. Domestic fowls, ducks, turkeys, geese and pigeons are all subject to the disease. Poultry affected with this malady,

unless in cases when it proves very rapidly fatal, exhibit characteristic signs of suffering. Their feathers are bristling, their wings droop, they sway from side to side, drag their legs, eat nothing and drink much. The comb is flaccid and livid. There is diarrhoea, at first glairy, then foamy, and towards the end often streaked with blood.

GAME.

Game is, with few exceptions, rarely exposed for sale in a fresh condition. Most kinds of game are liable to a cholera undistinguishable from that affecting poultry, and to many fatal diseases appearing as epidemics among them ; but there are no characteristic signs whereby the subjects of any of those diseases may be known should they find their way into the market. Intestinal worms are also often found in the bodies of game, but they do not prejudice the flesh.

FISH.

The freshness of fish is indicated by its being firm and stiff. In really prime condition, if held out in a horizontal position by the hand, it will remain rigid. Any drooping of the tail shows that it is not quite fresh, and, indeed, the extent of this drooping may not unfairly be taken as a measure of want of freshness in the fish. The fish hawked about the streets is often what the shops have failed to sell, and much of it is very limp. However, before an officer is justified in seizing fish, it must be a stage beyond being merely unfresh. If the fish besides being limp is actually softened in parts, and if it has a distinctly disagreeable odor, there is sufficient evidence of commencing decomposition to warrant seizure.

It is claimed by some that meat kept long by means of ice or refrigerators, undergoes change more rapidly and is subject to some peculiar accidents of decomposition, but the facts stated have not been accepted as established.

It is known that salted meats, ham and other smoked meat and canned meats sometimes occasion sickness, but the law of their action is not fully understood. No such cases should escape the careful attention and analysis of Health Boards. We thus draw

OF THE BOARD OF HEALTH.

to the public and of all dealers to the need of legal
right of the sale of all flesh used as food.

and other Circulars of the State Board of Health may be had on

EZRA M. HUNT, M. D.,
Secretary.

CIRCULAR NO. XX.

NEW JERSEY STATE BOARD OF HEALTH.

[OCCASIONAL BULLETIN SERIES.]

OUR LOCAL HEALTH BOARDS.

These are the powers. Our laws, while giving large and sufficient duties to the State Board, place the responsibility for the health of the respective communities with the local Boards.

They are given ample powers for necessary uses. It has been one of the most important functions of the State Board to elaborate laws requisite for wise and efficient sanitary administration, and to advise their adoption by the State. These various laws we shall notice hereafter.

We desire also to impress upon local Health Boards their privileges and their duties independent of the mere enforcement of law. The masses are not well informed as to the modes of preserving health. So long as our surroundings or our habits do not make us sick, or so long as we do not attribute sickness to them, we always incline to regard them as right and best. The first instinct of most families is to defend the healthfulness of their own homes. It is even wonderful how the owner of a pig-sty or some other nuisance will claim it to be harmless when the near neighbors are constantly annoyed by it.

There is a process of education, and citizens are becoming more and more intelligent as to the prerequisites to health. Even where the majority cannot be convinced, there are in almost every community a sufficient number who, when they come to realize the importance of sanitary administration, are influential in its support.

WHAT HEALTH BOARDS CAN DO.

Health Boards should regard the education of public opinion as one of their most important functions. In English towns it is common for physicians, engineers, and others to unite in a course of plain lectures to the people. Although attendance may not be large, the truth thus gets circulation. The columns of the local paper are often used to advantage. We know of several localities in this State that have been greatly benefited in health matters by the aid of the press. The various circulars and reports of the State Board are at the command of the local Boards, and will be sent direct if names and post-office addresses are furnished us. Circular XXXIX of this Board has various other suggestions as to the duties and privileges of local Boards.

OUR HEALTH LAWS.

The State has a code or system of Health Laws not surpassed by any State of the Union. They are the result of careful study and analysis, of a knowledge of the enactments of other countries and States, and of careful consultation on the part of lawyers, physicians, sanitarians, and legislators. There will no doubt be reason for occasional additions, but the greatest risk is that of injuring the harmony of the system by some amendment suggested by superficial knowledge or personal interest. Almost every year some law is proposed which shows a lack of information as to what is already on the statute book, or as to the real effect of the modification. Many of these are withdrawn on explanation. Others need the guard of local Boards, lest they should become enacted. Not only have the present laws been found facile and effective, but most of them have been before the Supreme Court or the Court of Errors and Appeals, and so have the highest sanction. The Central Law is that found in Chapter LXVIII, laws of 1887, and to be found with notes in Circular LX of the State Board.

Next in importance to it is the law as to Vital Statistics, to be found in Chapter XXXIX, laws of 1888, and in Circular LXVI of the Board.

Inasmuch as there cannot be healthy people without healthy homes, the next law in importance is the Plumbing Law, to be found in Chapter LVI, Laws of 1888, and in Circular LXV of the board.

In addition to these, the laws as to drainage, as to adulteration of foods and drugs, as to kerosene, as to the diseases of animals, etc., and many others which are referred to by title in Circular LX, need the attention of all boards.

While there are many cases where legal advice may be required, and while Health Boards will sometimes be defeated by reason of errors of judgment or by oversight of technical methods of procedure, we believe that those who will carefully read these laws and the notes accompanying, will seldom be in doubt as to modes of procedure. All boards should pass carefully-drawn ordinances, of which samples will be furnished from this office. As a rule, a fine of the person not abating a nuisance is better than for the board to proceed to abate and afterwards collect. Often a resort to Chancery is the quickest and most effective way.

LAWS AS TO VITAL STATISTICS.

As a rule, boards do not realize how essential vital statistics are in any guardianship of the public health. They tell where disease is occurring, what its character is, and whether it is mostly affecting children or adults. The health officer who carefully and frequently looks over the record gets valuable information. It is true that in small communities this is not so apparent, but the returns are no less important for the State and as indicating what is local, although it takes longer time to arrive at results. It is also true that the number of yearly deaths is not the chief or only indication as to the health of a locality, but it is one very important item to be compared with other facts. Returns of births and marriages are necessary, because without these we do not know enough of ages and of the material with which sickness has to deal.

It is enough to say that the necessity of these returns is con-

ceded in all countries where there is State or municipal care of the public health. While the general study of them must necessarily be at a central office, each city should know how many deaths occur each year in each ward and from what causes. Cases that have been before the higher courts, fully attest the right of States to require returns as to these social and vital facts.

NOTIFICATION OF CONTAGIOUS DISEASES.

It is now admitted by all sanitarians and by all physicians who have familiarized themselves with the conditions for sanitary administration, that there must be a system of early modification as to contagious diseases. About fifty towns in England have of their own motion and in local acts obtained power to require the notification of infectious diseases. In July of the present year (1889) the government introduced into parliament a "Notification of Diseases Bill," as a general measure. The London *Lancet* thus comments upon it:

"The introduction by the government of the Notification of Diseases Bill is only what everyone who has observed the signs of the times must have expected. Whatever liberty may mean in political and democratic parlance, it is becoming increasingly evident that it does not mean personal freedom in matters of disease. A man may say, 'I have a right to have small-pox in my house if I please, and to keep the fact a secret to myself. My house is my castle, and if I like to harbor scarlet fever in it, whose business is that but my own?' But any man who reasons so will soon find himself contradicted by the law of a democratic parliament. Nor is parliament acting hastily in this matter. On the contrary, it is acting slowly, timidly, and somewhat feebly—as, alas! is its wont. It does not propose by its own direct action to restrict the liberty of communities, but it gives leave to such communities to restrict their own liberty. It formulates a general act for this purpose, and says, 'Use it, adopt it, if you like.' To show how slow parliament is, it is only necessary to say that it has already been anticipated by about fifty towns which have of their own motion and in local acts obtained power to require the notification of infectious diseases. There can be no doubt, therefore, that the State is quickly coming to believe that

amongst it many rights is the right, even at the cost of invading the privacy of homes, being informed of the existence of every case of important infectious disease. Even in the medical profession, where, as we know, there is considerable difference of opinion as to the best way of acquiring this information, there is no doubt as to the right of the State to ask for it where it sees fit. The assertion of this right, and the general recognition of it by all classes of the people, is a very noticeable fact. It is another restriction of personal liberty for the good of the whole community, which, after all, is the essence and glory of civilization. It may occasion friction at first, but it will gradually be accepted by all as working for the good of all. We cannot imagine a long delay in the general acceptance of the principle that a community has a right to protect itself from an infected person, and to impose duties and restrictions on that person, and on those within his influence, or the area of his infection—whether it be by notification, or isolation, or vaccination, or any other measure that the community in its judgment thinks essential to its own protection."

Without such notification, health authorities cannot have the early knowledge of communicable diseases necessary to their limitation. The only questions that can arise are: How far and to what degree is this essential? By whom shall the notification be made? What shall be the conditions thereof?

While the right of the State or municipality to require it, for public good, is admitted, it is to be regarded as a special exercise of legal command, and as such to be made with thoughtful consideration. While it is not a matter to be left to private judgment, it should be such as to commend itself to the medical man who desires the limitation of infectuous diseases. We think—

I. It should not be required in sparse populations, except when the peril is greater than in ordinary separated buildings, or when the disease shows a tendency to prevail.

II. It should be required in all cities or compact villages.

III. It should not apply to all communicable diseases. It is, for instance, impracticable or needless to attempt to apply it to whooping cough or mumps.

IV. The notification should be only to some one designated, member or inspector of the Board of Health, and not used as public information.

V. It should be by the medical attendant, and should only give name and locality. Only the physician can certify to the nature of the case, and he should have to give only such particulars as are necessary to identify the case. If he chooses to indicate whether or not a speedy visit from the inspector is desirable, or that he will himself secure all necessary protection, he may so do. Such is the custom in Edinboro.

VI. He should receive some compensation. The duty asked of him is wholly different from that when he is asked to report a birth or a death. The beginning or the ending of a life is in its nature special, and he who is in charge at the event has a natural obligation, if required by law, to acquaint the authorities with the fact. The recognition of such a profession involves the duty of such returns in such way as the State, in its best wisdom, may designate. The idea that a law cannot compel a man to do anything it does not pay him for doing has never had any legal standing. To require such reports in the practice of enlightened nations, and such have been the rulings of all courts.

Not so as to reporting the fact of a patient sick with a communicable disease. It is not necessarily a matter of life or death. It is asking a service having no relation as a legal record, and not in itself announcing an event like that of life and death.

The bill to which we have alluded allows about fifty cents for a report. Our own law allows twenty-five cents. We regard this as reasonable.

An article by Mr. Bayles, of Orange, New Jersey, and formerly President of the New York City Board of Health, so fully considers this matter in the 12th Report of the Board, that we only need to refer to it for further details.

LAW AS TO CESSPOOLS, VAULTS, GARBAGE, ETC.

The recent law, chapter CCLVI, Laws of 1889, authorizing Local Boards of Health to license and receive fees for collection of the contents of cesspools and vaults is important, as it allows this matter to be regulated as it can be only by a system of permits, while in some places it may be done by the individual householder under regulation. Experience shows it is generally better

to be done by the licensed scavenger. The law is generally construed to apply also to garbage and all scavenger work.

OTHER LAWS.

Laws as to drainage are important in localities where the surface soil is wet or swampy.

The laws as to animal diseases recognize that local boards have some relation to these. They should always be inquired into in order to know whether they are contagious, or if of a class communicable to mankind. While we have as yet no laws regulating the keeping of cattle, city boards can decide when the keeping of animals within city limits is a nuisance; also local cases of nuisance can be dealt with by any board. No man has a right to use his property to the risk and detriment of his neighbor's health.

The laws as to petroleum or kerosene are such that guard should be had as to sales, and any accident should be investigated.

The board is always ready to answer questions as to various other laws having a bearing on the public health.

Local Boards of Health should be familiar with existing laws so as to execute them when there is need and so as to guard them well, lest careless or crude legislation should embarrass them.

Members of Boards, their attorneys and the Recorders of Vital Statistics are the natural guardians of these laws.

It is well to consult the State Board as to all legislation relating to the public health.

HEALTH INSPECTORS.

No more important officers form a part of the government of a city. The same may be said of towns, villages and many country districts. In England and other countries so important is the service that men are educated for it—receive degrees as do engineers, physicians, &c.

While we have not attained to this we must have that ideal before us. At Princeton College, at Rutgers, at Stevens' Institute, facilities for short courses can be secured.

Some of our most experienced Inspectors have grasped the idea of the importance of the work and of the training needed, and

have done much to acquaint themselves with their duties. While the compensation is still low, except in three or four of our cities, it will increase with the competency of Inspectors and a greater realization of their necessity.

The Inspector who thinks he knows, when he does not ; who is all dictatory and never persuasive ; who regards the detection and removal of a stench all there is in it ; who makes only verbal reports, and who never can find time to attend the annual meeting of the New Jersey Sanitary Association, or to meet with other Inspectors of more skill and experience, is himself often of the nature of a nuisance. Others, who may be plain, unlettered men, but who have applied themselves diligently to observe and to do their duty, merit and receive our appreciation. Every Health Inspector should be a close observer and be familiar with the actual carrying out of the best methods of cleanliness and disinfection. He should know the chief defects of every house of the city. He should be able to detect bad plumbing, or poor water supply, or gas leakage, or the condition of sewers and cesspools. He should know how many depend on wells and how they are located. He should inspect, with some such book as is furnished by the board. He should be familiar with some such guide as Wilson's Handbook of Hygiene ; should take some sanitary journal, and have on hand the Health Laws and Circulars, and be familiar with the reports of the State Board. These all are to be studied—not merely read. We have some good instances of how Health Inspectors have become intelligent in their work and are recognized by physicians and by many citizens as of great service. Let them be paid good salaries and be held to rigid service. If ever using their vocation in ward politics they should be discharged. They have a special service which makes it as improper for them to electioneer in a tenement house as it is for a doctor to discuss elections by the bedside. May good Inspectors multiply and be appreciated for the excellent service they undertake.

Boards of Health and Inspectors should include in their work at least a yearly sanitary inspection of prisons, jails, almshouses, railroad stations, cemeteries, and some factories.

We subjoin as specimens two recent examinations of summer hotels by Dr. Mitchell, of Asbury Park :

E. M. Hunt, M. D., Secretary New Jersey State Board of Health:

SIR.—I have to-day inspected a hotel at Ocean Beach, Monmouth county. A new drainage system has just been completed for the hotel. It is constructed as follows :

Stationary wash bowls have been placed in one hundred and six (106) of the one hundred and ten (110) rooms in the hotel. Each wash bowl is connected by a one-inch lead pipe, with a galvanized iron pipe on the outside of the building. No traps are placed under any of the bowls. The lead pipe is joined to the galvanized sheet-iron pipe by a putty joint. The galvanized iron pipe is three inches square, with soldered joints. It is made of sheet metal. There is one line of this sheet metal pipe for each row of rooms on each story, making six lines of pipe for each of the two wings of the building. These sheet metal pipes are conducted to a cesspool. The cesspool is ten feet wide, twenty-six feet long, and fifteen feet deep (10x26x15). It is located about ten feet west of the hotel. It is floored over with loose jointed boards, and over it is built a house. This house is one story high, and is used as the laundry. Six persons were at work in the laundry at the time of my visit. Four stationary wash trays are located in the laundry. Their waste pipes descend straight through the floor (without trap) into the cesspool. A large slop hopper also pierces laundry floor. Innumerable holes in the floor admit free exit for all gases which seek to leave the cesspool. The servant's dining room adjoins the laundry, and it is entered by a door leading from the laundry. An ice-house for meats, etc., about 8x10, adjoins the servant's dining room and laundry. The waste water from the ice-house is carried through a three-inch tin pipe, about two feet long, directly into the cesspool. There is no trap on this pipe. A steam pump is placed in the laundry for use in emptying the cesspool. The cesspool is pumped out every second night. The contents are discharged into the ocean in front of the hotel. The ice-box in the carving room is connected by a tin pipe directly into one of the sheet metal drain pipes. Another refrigerator is located in the basement. In this ice box the milk is stored. The waste from this ice-box falls upon the ground from a pipe in the bottom of the box. There is no trap on this pipe. The ground surface is about one foot below the drip pipes.

The water closets are west of the hotel, and between the hotel and the cesspool. In the first story apartment there are three urinals, without traps, and four pan water closets. On the second floor there are two wash-out closets.

The water supply of the hotel is now taken from an artesian

well which has recently been bored. Three servants' bed rooms in the basement—reached through a doorway from the gents' water closet—are damp and musty, and unfit for human habitation.

Very respectfully,

HENRY MITCHELL, D. I.

July 9th, 1889.

NEW JERSEY STATE BOARD OF HEALTH, }
INSPECTION DEPARTMENT, }
ASBURY PARK, July 9th, 1889. }

DEAR SIR.—An inspection of your hotel shows that the drainage system of the building is constructed in a manner which imperils the health and life of every inmate of the establishment. Every one of the one hundred and six (106) bed rooms, in which is fixed a stationary wash-bowl, is now receiving dangerous gases directly from the drains. The putty between lead waste pipes and sheet-iron drains are also leaking dangerous gases beneath nearly every window of the house. These conditions, and numerous other sanitary defects, render the hotel unsafe for human occupancy.

Yours truly,

HENRY MITCHELL, D. I.

To E. M. Hunt, M. D., Secretary New Jersey State Board of Health:

SIR.—July 17th, 1889, I visited S. and O. The sewage from the S. sewer is still flowing out upon the sand on the ocean beach, and the nuisance caused thereby is in nowise abated. Since my visit to this place, July 9th, 1889, a wooden trunk, one foot square, has been constructed. It begins at the broken tile pipe, at the westerly end of the iron terminus of the sewer outlet, and extends about seventy or eighty feet toward the sea. This trunk is loosely put together, and its joints leak throughout its whole length. Its calibre is not sufficient to carry the sewage, and its easterly end is obstructed by sand. The whole of the sewage discharged is therefore going upon the sand.

This misguided attempt to abate the nuisance due to the outfall upon the sand of sewage, has therefore proved to have been a useless expenditure. Had the wooden trunk been made of plank instead of boards, and had its capacity been 2' x 1' instead of 1' x 1', the purpose aimed at would undoubtedly have been accomplished, *i. e.*, temporary overcoming of offensive odors.

Permanent and safe disposal for the sewage of S. can never be attained by the present system, for the following reasons :

1. The capacity of the main sewer is too small to carry the fluids which it receives. This fact is demonstrated by the frequent backing-up into premises, which has frequently occurred.

2. The sewage is discharged directly into the sea, and the tide arrests the flow, and prevents rapid outfall.

3. The terminus of the sewer is not far enough from shore to obviate choking with sand.

4. No ventilation is provided for the main sewer, and gases are forced landward by each rise in tide.

In Wall township I inspected the water supply and drainage of a number of hotels. The water supply of A. is from two wells. The water from one of them is offensive to the sense of smell, and the two wells are only about 25' apart. I believe that both of them are polluted, for wash fluids have for years been cast upon the ground all about them. The privy vault stands as when last described. It emits exceedingly offensive odors, which are wafted into the windows of the hotel. It is about 25' from one wing of the hotel and 15' from another. It is covered by a two-story privy. It is a nuisance to the occupants of all of the rear rooms of the hotel.

The B. hotel has an unsafe water supply, and its privy vault is a nuisance. The miserable sheet iron trough which was constructed several years ago, and placed beneath the seats in the privy, has been taken out because it was an abomination too unendurable for guests, and the old method of direct deposit for excrement has been re-established. The vault is large ; about 25' from the hotel, and it is adjoined by a basement room which is used as a bakery for the hotel. During the westerly winds, such as prevailed when I inspected the premises, the odors from the vault pervade the whole of the hotel.

The water supply is from a dug well situated about 22' from the privy vault. The water is offensive to smell, and I believe the great demand upon the well causes filthy fluids which leak from the privy vault to enter the well. Another well on the south side of the hotel is less offensive, and it is now used for drinking.

The B. House has three surface wells, made by driving 1½" pipes about 12' or 14' into the ground. Two of them are beneath the building. Sinks are placed under the pumps of these wells, and the waste pipes both go into a wooden drain 6" square. This box is about 30' or 35' in length, and is entirely within the laundry and beneath the hotel. It discharges into a six-inch tile drain which terminates in a cesspool on the ocean beach. The cesspool is unventilated, save by the drain. The wooden box and the tile drain have an open and leaky junction, and gases of a most offensive sort escape from all parts of the box and from the opening in

the tile drain. The junction of wood drain and tile drain is under the south porch of the hotel. Nine wash trays in the laundry also discharge into the same kind of box drain, which is (like the other) above the floor. A slop hopper in one corner of the laundry is made of brick, and it overflows into a tile pipe which is connected with the six-inch tile pipe above referred to. No traps of any sort could be found on these premises. I am of the opinion that all of the three wells are polluted by escaping slops and kitchen fluids.

Very respectfully,

HENRY MITCHELL, D. I.

July 18, 1889.

THE ANNUAL REPORT FROM LOCAL BOARDS.

This is due in October. It should give the facts according to schedule, if not already reported. Areas of townships and cities should be given in acres or square miles as far as possible. The report should state, with some detail, what the Board has done during the past year. Also whether the Board has passed a series of ordinances after the model in the 9th Report or in some other form.

Particular cases of nuisance or sickness should be reported. The number of house-to-house inspections should be given. These should be on file so that the Local Board or our Inspectors can refer to them. Be prompt in returning this report. All should be in by November 15th, and most before the close of October. Be careful to give the name and Post Office address of every member of the Board and of the Health Inspectors.

OCCASIONAL HEALTH BULLETINS.

A few of the State Boards of Health publish a monthly pamphlet or bulletin made up of local matters and various news items. We have for the past two years examined many of these. The State Board has carefully considered the propriety of such a publication. It does not at present believe it of sufficient importance to justify the expense. Several of the Sanitary Journals are better than it could be, and some one of these should be taken by many of our Local Boards. The Annual Report and various Circulars, together with correspondence and visitation, enable us to communicate sufficiently with the Boards. Excep-

tions to this may occur, and then the occasional Bulletin answers our purpose. Where Local Boards are inefficient, personal pleading with them, or the Report of a State Inspector published in the local press, will do all that can be done by more extended circulation of our complaint. Administrative methods are best learned through the annual reports of the State and Local Boards, and through visitation of localities. He who wishes to be intelligent in health matters now has abundant opportunity. The Board is ready at any time to furnish information, to distribute its Circulars and Reports, and in complicated cases to order special inspection.

VARIOUS ITEMS.

The agency of low forms of vegetable life known as microphytes, bacteria, bacilli, etc., in producing changes in organic materials and causing the phenomena of disease, is fully recognized. But it is not so easy to determine which are harmless, which are injurious, which are specific and which common, or whether they produce results directly, mechanically or through their chemical compounds.

Be sure of your facts. Announce nothing as settled until these have been studied in great numbers, both by the laboratorian and the clinician, and remember that conclusions from facts involve quite a different process from observations of facts. Many observe more accurately than they make inferences.

Dr. Ballard, in a recent government report, speaks of diarrhoea as not a mere intestinal disturbance, "but a general disease of a specific character, to which a distinct and specific name other than diarrhoea ought to be attached." Cholera infantum, dysentery, etc., have so long been regarded in this country.

The ability of one form of bacteria to produce different forms of disease is now being discussed. "There seems to be experimental ground for the belief that some forms at least of diphtheria and erysipelas, and some forms of phlegmonous inflammation are phases of the inflammatory process having one at least of these prominent etiological factors in common, namely, the inciting species of bacteria.

Over 100,000 persons availed themselves of the public baths of Philadelphia for July, 1889.

The summer freshets of 1889 have shown that there are many mill-dams that so obstruct drainage or overflow lands or peril the inhabitants of adjacent towns as that they should cease to exist.

Several of our Health Boards, under our drainage laws are succeeding in removing or in preventing the erection of mill dams.

In addition to the good work done by such boards as the ones of Newark, Paterson, Trenton, Asbury Park, etc., those of Rutherford, Englewood, Ocean Grove, Plainfield and a few others have recently come to realize the great importance and the beneficent results of their work.

J. Mecray, Jr., M. D., of Cape May City, acts as inspector for the local boards in that part of the State.

Besides attention to the calls of local boards and to the organization and direction of boards as to ordinances, Inspector Dr A. Clark Hunt is preparing for the next report a description of the sewer systems of the State. Inspector Henry Mitchell has recently inspected several health resorts.

The almshouses, jails and prisons of the State are showing some improvement, as the result of inspections

One of the Brothers Hare has said that "the essential character of no theory or institution is adequately expressed in its inaugurators, since they made the institution, while it is the institution that makes the next generation of its administrators. This, if rightly understood, announced a great truth. Those who inaugurate a system or institution naturally make it the expression of their theory or idea of what such an institution should be. If they are not ideal, but practical men, and have the opportunity to watch the working of their system and skill to discern the modifications needed, the system becomes the transcript not only of its inaugurators but of experience. The next generation of administrators have the advantage of all that has gone before, and ought to be able to make it the accumulated result of the labors and practical skill of all identified with it. We sometimes outline the future of the New Jersey Board of Health when its original members shall have passed from service. In falling into capable hands, it will develop new directions of increased usefulness, and recog-

REPORT OF THE BOARD OF HEALTH.

Builders as only the builders of foundations admitting of useful superstructure through all the generations.

Of this and other circulars of the State Board of Health may be had on

EZRA M. HUNT, M. D.,

Secretary.

LIX.

OF

STATE BOARD OF HEALTH OF NEW JERSEY.

LAWS AND REGULATIONS

ON

THE

ADULTERATION OF FOODS
AND PETROLEUM.

The Legislature of this State has seen fit to pass laws to protect the people from articles of food and drugs that are not what they profess to be, or that are injurious to the public health.

Also, on account of the number of accidents arising from imperfectly prepared petroleum oils, as used for lighting purposes, it has defined the standard of purity required for these.

The general law to prevent the adulteration of food and drugs is contained in Chapter CCXVII, Laws of 1881, and in the supplement thereto, Chapter CXXXIX, Laws of 1883.

The special laws as to the adulteration of milk are to be found Chapter LXXXII, Laws of 1882; Chapter CLXXXV, Laws of 1883; Chapter XC, Laws of 1884; Chapter CLXXXV, Laws of 1885; Chapter CLXXXVI, Laws of 1886, Chapter II, Laws of 1887.

The special law as to oleomargarine or other imitation of dairy products is to be found Chapter LXXXIV, Laws of 1886, and Chapter CL, Laws of 1887.

The laws as to illuminating petroleum oils are those found

Chapter CLXVIII, Laws of 1882, and Chapter XCVII, Laws of 1883. (Send for Circular XLII of this Board.)

The laws as to the adulteration of food or drugs have been passed more as commercial regulations than with special reference to the public health; yet they cannot be viewed wholly as for protection against commercial frauds. Either by carelessness, ignorance or intent, substances may be added or changes occur which render the article dangerous to health.

The laws as to oleomargarine or other dairy products, and as to milk, are executed by the Dairy Commissioner, Wm. K. Newton, M. D., of Paterson. This Board has the appointment of the Commissioner, and he makes a statement or report to the Board once a year. This Board has no relation to the work done. He appoints his own Chemists, Inspectors or assistants, pays all expenses from a special appropriation, and makes his chief report directly to the Legislature.

It is different as to the general laws relating to the adulteration of foods and drugs. Three different sets of officers have relation to these laws

I The State Board of Health "fixes the limits of variability permissible in any article of food or drug or compound the standard of which is not established by any national pharmacopœia," and can adopt various regulations as to it. It has power to appoint Chemists and Inspectors to act under its direction, and to proceed directly against those violating the act. Since, however, there are special provisions and a special officer for two chief adulterations and some co ordinate powers as to all adulterations, this Board seeks to deal, not with commercial frauds but with adulterations directly injurious to health.

II. Any Inspector or other officer of any Local Board of Health has power, as thus given:

"8. And be it enacted, That any analyst or inspectors appointed by the State Board of Health, and any inspector or other officer of any Local Board of Health, shall have power to inspect any article of food, or drugs, wherever exposed for sale, or offered, or held for sale, or whether in transit or otherwise; and if, upon inspection of such food or drugs, the same shall be found adulterated within the meaning of this act or the act to which this act is a supplement, the said inspector or other officers aforesaid, shall

have power and may prohibit the sale or disposal of said articles until decision shall be rendered by the court, justice of the peace, recorder or police justice before whom the defendant may be brought."

It is best in these cases that the analyses be made by some one of the Chemists which have been designated by the State Board of Health.

III. The State Dairy Commissioner has the following relation to the act:

CHAPTER CXXVI, LAWS OF 1887.

A Supplement to an act entitled "An act to prevent the adulteration of food or drugs," approved March twenty-fifth, one thousand eight hundred and eighty-one.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That the State Dairy Commissioner is hereby directed and empowered to aid in the enforcement of the provisions of the act to which this is a supplement; and said commissioner and his assistants duly commissioned shall be and are hereby made Inspectors under the act to which this act is a supplement; the expense of enforcing said act shall be paid out of the appropriation already made for the use of said dairy commissioner for the enforcement of the act of March twenty-second, one thousand eight hundred and eighty-six, entitled "An act to prevent deception in the sale of oleomargarine, butterine or any imitation of dairy products, and to preserve the public health."

2. And be it enacted, That this act take effect immediately.

Approved April 11th, 1887.

While he is "empowered to aid," it is also evident that some of his powers are co-ordinate, rather than under direction of the board.

The law makes himself and his assistants Inspectors under the act, and the expense of his part of the enforcement of the act is regulated by him and drawn from the appropriation of the oleomargarine law. The chief relation of the board is that it defines the limits of variability in articles and determines any article of food exempted from the law, and it has to designate the Analysts or Chemists to whom all samples are to be referred.

In the performance of the duties of this board in relation to the law, the following are the rules which the State Board of Health has adopted for the government of Inspectors and Analysts under the law :

RULES.

DUTIES OF INSPECTORS.

1. The Inspector is to buy samples of food or drugs, and to seal each sample in the presence of a witness if prosecution is intended.
2. The Inspector must affix to each sample a label bearing the number as authorized for that purpose.
3. Under no circumstance is the Inspector to inform the Analyst as to the source of the sample before the analysis shall have been completed.
4. Inspectors are to keep a record of each sample as follows :
 - (1) Number of sample.
 - (2) Date and time of purchase.
 - (3) Name of witness to sealing.
 - (4) Name and address of seller.
 - (5) Name and address of producer, manufacturer or wholesaler, when known, with marks on original package.
 - (6) Name of Analyst and date of sending.
 - (7) How sent to Analyst.
5. If the seller desires a portion of the sample the Inspector is to deliver it under seal. The duplicate sample left with seller should have a label containing the same marks as are affixed to the portion taken by the Inspector.
6. The Inspector is to deliver the sample to the Analyst, taking his receipt for the same, or he may send it by registered mail, express or special messenger.

DUTIES OF THE ANALYSTS.

1. The Chemist or Analyst is to analyze the samples immediately upon the receipt thereof.
2. Samples, with the exception of milk and similar perishable articles, are to be divided by the Analyst and a portion sealed up,

and a copy of the original label affixed, or the original package preserved, after removing sufficient for analysis, for three months.

3. Should the result of an analysis be disputed in any case in which analysis has been ordered by the State Board of Health, the defendant or person selling the sample in question, or his attorney, may appeal to said board through its secretary, and said secretary shall then require another chemist to repeat the analysis, using a duplicate portion of the original sample. But when such an appeal shall be made, a sum of money sufficient to cover the expenses of the second analysis shall be deposited with the Secretary of the State Board of Health; which sum shall be paid to the analyst designated, as required above, to make said second analysis, in case the analysis shall be found to agree with the first in all essential particulars. But in case the sample has been procured by the dairy commissioner, or inspectors appointed by him, any such appeal shall be to the dairy commissioner, and the money deposit for the second analysis be made with him, subject to the conditions above stated.

4. In the case of all articles having a standard of purity fixed by any of the laws of the State, the certificate of the analyst should show the relation of the article in question to that standard.

5. Each analyst should keep a record book in which should be entered notes as follows:

- (1) From whom the sample is received.
- (2) Date, time and manner of receiving the sample.
- (3) Marks on package, sealed or not.
- (4) Results of analysis in detail.

6. At the completion of the analysis, a certificate in the form given below shall be forwarded to the Board of Health if the analysis had been ordered through it, or to the dairy commissioner if ordered through him.

CERTIFICATE.

To whom it may concern :

I,a chemist appointed by the State Board of Health of New Jersey, under the provisions of an act entitled "An act to prevent the adulteration of food and drugs," approved March 25th, 1881, do hereby certify that I received from.....on the.....day of....., 18....., a sample of....., sealed as required by the rules of said Board, and bearing the following marks to wit:

I carefully mixed said sample and have analyzed the same, and hereby certify and declare the results of my analysis to be as follows:
.....[Signature.]

7. Samples sent to analysts are to be retained for the space of three months.

EXCEPTIONS REGARDED BY THE BOARD OF HEALTH AS RECOGNIZED BY THE LAW.

Mustard—Compounds of mustard, with rice flour, starch or flour, may be sold if each package is marked "Compounded Mustard," and if not more than 25 per cent. of such substances are added to the ground mustard. The words "compounded mustard" shall be printed on each package in clear letters, not smaller than great primer.

Coffee—Mixtures of coffee, with chickory, rye, wheat, peas or other cereals, may be sold if each package is marked "Coffee Mixture," provided that said mixture shall contain at least 25 per cent. of true coffee. The words "coffee mixture" shall be printed on each package in clear letters, not smaller than great primer.

Syrups—When mixed with glucose, syrups may be sold if the purchaser is informed at the time of the purchase that said syrup is mixed with glucose or grape sugar.

Condensed Milk—Condensed milk shall contain at least 8.50 per cent. of fat.

Vinegar—Vinegar shall contain at least 4.50 per cent. of absolute acetic acid. Vinegar other than pure cider vinegar may be sold if the purchaser is informed at the time of purchase that the article is not cider vinegar.

Milk shall contain the amount of solids required by law.

Canned Goods shall not contain any poisonous metal.

Pickles shall not contain any metal.

Baking Powders—The market is flooded with large quantities of inferior baking powders, and as these are sold largely to working people, and are used by these people as substitutes for yeast, it is necessary, in order that light bread be made, that these powders have proper leavening power. This power the cheaper powders do not have, many of them giving off very little carbonic gas. These cheap and imperfect baking powders contain alum or phosphate, and are so crudely compounded that a residue is left in the bread or biscuit after baking. The public are warned against these, and in their suppression will be faithfully aided.

The purpose of the State Board of Health in the future will be, as in the past, to watch and investigate any suspected adulterations affecting the public health, to suppress the same and to acquaint the public, through the reports of the State Board, with the more frequent and injurious adulterations, except those of milk and oleomargarine, which are committed to a special commissioner. To adulterations which are only commercial frauds, although these need suppression, the Board of Health has no relation.

The Analysts or Chemists who have been selected under the law as to the adulterations of foods or drugs to make examinations when required, are Prof. A. R. Leeds, of Hoboken; Prof. H. B. Cornwall, of Princeton; Shippen Wallace, of Burlington, and Wm. K. Newton, M.D., of Paterson. These are at the command of the Dairy Commissioner for the examination of foods and drugs. They may be employed by him singly, or he may employ any one of them on terms which he may arrange.

There is no council or Committee of Analysts or Chemists, but

each Chemist is employed either by this Board or the Dairy Commissioner, as he is needed.

Under the milk law for analyses of milk, the same Chemists, together with August Drescher and H. B. Baldwin, of Newark, were appointed.

In addition, the act as to a State Laboratory, approved April, 1888, provides "that the Chemist or Chemists of the State Agricultural Experiment Station shall analyze all samples of milk, butter or other farm products, or the imitations thereof that may be sent to said Station by the State Dairy Commissioner.

Any communications as to water supply should be addressed to the State Board of Health.

The special attention of Local Boards is drawn to the law as to kerosene (Circular XLII), since it is now easy by proper local oversight to prevent the sale of dangerous oils.

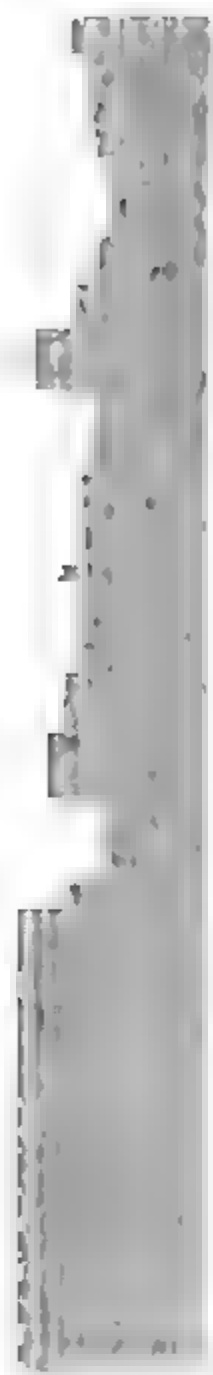
It is the desire of this Board fully to co-operate with all authorities as to the laws referred to in this Circular, so far as practicable and expedient, and so far as they fall under our jurisdiction or advisement.

For copies of Circulars, address

February, 1889.

EZRA M. HUNT, M. D., *Secretary*,

TRENTON, N. J.



MEDICAL REGISTRY.

The law makes it the duty of every person settling in this State for the practice of medicine and surgery, to file a copy of his diploma, or in case of twenty years' practice in any one locality in this State, a certificate thereof, in the office of the County Clerk. The diploma is not merely any writing or certificate which may be given, but must be from a chartered medical college. The law is founded upon the right of the public to know that those who claim capacity for the treatment of disease, should be able to show some evidence thereof. The State really owes it to itself somehow, to protect its citizens more fully from the imperfect knowledge and lack of skill of many, who, although graduated from inferior institutions, are not fitted for their work. Since the law at present reaches only to the requirement of registry, this must be fully complied with, and proper examination made of diplomas presented. The following are the lists furnished by County Clerks for the past year. County Clerks, when receiving copy of diploma, should enter upon it the P. O. address of the person.

ATLANTIC COUNTY.

NAME OF PHYSICIAN	P. O. ADDRESS.	DATE OF DIPLOMA	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY	WHEN COPY WAS DEP'D
Cordell, Eugene Fauntleroy	Atlantic City	Mar. 5, '89	Baltimore	July 12, '89
Cleveland, Arthur Horton	" "	May 1, '89	University of Pennsylvania	Aug. 10, '89
Carpenter, J. Thomas	" "	" "	" "	" "
Griswold, William,	Absecon	Apr. 15, '88	Homoeopathic, Jersey City	Jan. 12, '89
Garsides, W. B.	Atlantic City	Mar. 1, '88	" "	July 10, '89
Gadd, S. Wesley.	" "	May 1, '89	University of Pennsylvania	July 30, '89
Hunsberger, J. Newton	" "	" "	" "	Jan. 8, '89
Rush, Leamen	" "	Apr. 1, '82	Jefferson, Philadelphia.	July 2, '89
Pennington, Byron C.	" "	Mar. 21, '81	" "	June 1, '89
Reed, Eugene L.	" "	" "	1884 University of Pennsylvania	Nov. 3, '88
Thompson, Jesse B.	" "	May 1, '88	" "	Jan. 11, '89
Thatcher, Jesse William	Ocean City	" "	Hahnemann College, Phila.	July 10, '89

BERGEN COUNTY.

NAME OF PHYSICIAN	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY.	WHEN COPI WAS DEP'D.
Clark, Edward Wright	Tenafly . . .	May 12, '87	Col. Phys. & Surg. N. Y.	Jan. 23, '88
McFadden, George Howard	Hackensack	Mar. 11, '88	Bellevue Hosp. Med. College	Mar. 19, '88
Olto, Joan M.				May 28, '88
Van Winkle, Jacob O . .	Hackensack	May 12, '87	Col. Phys. & Surg. N. Y.	28, '88
Ackermann, William P	"	Mar	'70 Bellevue Hosp. Med. College	Aug. 17, '88
Coslin, Garret.	"	" 1, '68	"	12, '88
Hazzen, Elijah B. G	New York City	June 28, '89	Med. & Sur. Col. Jersey City	Oct. 14, '89
King, C. M. Murriel M	"	Sep. 27, '89	Univ. of N. Y., Buffalo	" 7, '89
Mullen, John	Caristadt	Oct. 11, '87	L. Is. Hosp. Coll. Brooklyn	" 24, '88
Pfingsten, Gustav	New York City	June 28, '89	Med. & Sur. Col., Jersey City	" 7, '89

BURLINGTON COUNTY.

Cassady, John Bradner . .	Burlington. . .	April, '88	Pennsylvania Med. College.	Apr. 6, '88
Balcon, Lafayette	"	Apr. 16, '64	Buffalo Medical University.	May 31, '88
Bancroft, Augustine A . .	"	Apr. 27, '89	Hahneman College, Phila.	" "
Follett, William M . . .	Translent . .	Mar. 1, '73	Electrical Med. Col., N. Y.	" "
McFarland, Burr W. . .	Vincentown .	April, '69	Jefferson Med. Col., Phila.	Feb. 8, '88
Still, Joseph C.	Mount Holly.	"	Affidavit filed May 27, 1888.	" "
Ironsides, Allen B. . . .	Florence. . .	Apr. 4, '89	Hahneman	Apr. 4, '89
Lippincott, Thomas S . . .	Pemberton .	Mar. 15, '88	Baltimore Phys. Sur.	Aug. 30, '88
Lane, Lewis S.	"	Apr. 4, '88	Jefferson Medical College .	Sept. 11, '88
Martin, William.	Rancocas . .	"	"	Apr. 15, '88
Parrish, William	Burlington. .	Apr. 3, '85	University of Maryland . .	Apr. 23, '88
Hilliard, Franklin W. . .	Mount Holly. .	"	Affidavit filed.	Apr. 13, '88

CAMDEN COUNTY.

NAME OF PHYSICIAN	P. O. ADDRESS	DATE OF DIPLOMA	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY	WHEN DIPLOMA WAS DEC.
Denney R P		June 20 '70	Kan. Med. Col. of Pa	Dec 27, '87
Palmer W L		Mar 29 '81	Jefferson Medical College	" 30, '87
Croft J. A		Sept '88	Harvard Medical College	Jan 23, '88
Masston A J		May 3 '79	"	" 25, '88
Dunham S J	Camden	Dec 1 '76	Amer. Health Coll., Cin O	Feb 8, '84
Hylton John Dunbar	Palmyra	Mar 14 '80	University of Pa	" 14, '88
Gibbs Godfrey		" 1	84 Phil. Med. Coll. Phila	Mar 1, '88
Fortner Byron E		" 1	88 Penn. Col. of Den Surg	" 7, '88
Loper, Augustus		May 20 '80	Can. Phys. & Surg. Ontario	" 9, '88
Soper Edward W	Gloucester City	" 12	80 Eclectic Acad. Phila, O	"
Delap, W L		Mar 31, '80	Hahnemann Med. College	" 28, '88
Adamsen Hans		April 1 '88	Jefferson Med. College	April 16, '88
Lewis Benjamin Sykes		"	"	" 26, '88
Will, E Hart		" 6	88 Hahnemann Med. College	May 2, '88
Miller Edwin H		May " '88	University of Pennsylvania	" 3, '88
Macfarland R W		April 4 '88	Jefferson Medical College	" 7, '89
Lane J Lewis		" 1	"	"
Sharp, Lewis L		" 6	88 Phil. Med. Coll. Phila	" 17, '88
Kling, Joseph H		June 20, '87	Eclectic Med. Col., Phila	" 21, '88
Pursell John C		"	82 Jefferson Medical College	June 15, '88
Lambark Frederick Jr		May 2 '87	University of Pennsylvania	" 21, '88
Smith Samuel Bryan		April 6, '88	Hahn. Med. Col. Phila	"
Hinds, W Hugh		May 22 '78	American Health College	" 27, '88
Murray J M		Mar 10, '79	1st Y. A. C. N. 21 St	July 13, '88
Barr J S		April 1 '86	Jefferson Medical College	" 14, '88
Hume, Chas		Mar 4 '82	Massachusetts Medical College	" 16, '88
Jennings, W B		April 4, '88	Jefferson Medical College	" 18, '88
Work, R A		Nov 27 '80	American Health College	Aug 4, '88
Lucker Edward J		Mar 9, '80	University of New York	" 1, '88
Hess, F A		"	Metropolitan Med. Col. N. Y	Sept 14, '88
Hessmer, Orange Whitney		April 4, '88	Jefferson Medical College	" 22, '88
Morris, Edw K	Collingswood	Mar 10 '80	Hahnemann Medical College	Oct 4, '88
Flower R C		"	81 Amer. Health Coll. Cin O	" 16, '88
Barnard Newton H		April 6, '88	Hahnemann Medical College	" 22, '88
Knick, M Luther		" 4	88 Jefferson Medical College	Dec 8, '88
Wright A	Berlin	Mar 9, '81	Hahnemann Medical College	" 19, '88
Bray W T	Camden	April 3, '87	Jefferson Medical College	Feb 7, '89
Ashcraft, Samuel Elster		" 4	"	" 7, '89
Bower E E		May 1 '88	University of Pennsylvania	" 14, '89
Shoen, Herbert A		Mar 24 '79	"	Mar 8, '89
Langsborn Hannah E		Dec 30 '51	Pennsylvania Med. College	" 21, '89
Scott John M		Mar 23, '89	McGill Medical College	" 23, '89
Beckman O H		" 26	84 Jefferson Medical College	" 27, '89
Williams W C		Mar 8, '77	Hahnemann Medical College	April 6, '89
Jennings, Charles H	Merchantville	April " '89	Jefferson Medical College	" 9, '89
Moranter Wm S		" 1	89 Hahnemann Medical College	"
Nuenneman M A		Mar 23, '87	Penn. Medical College Phila	" 6, '89
George James A		April 1 '80	Hahnemann Medical College	" 11, '89
Fraser Jas Mitchell		Nov 27 '87	McGill University Montreal	" 12, '89
Makner George Hudson		April 3 '80	Jefferson Medical College	" 13, '89
Stearns, Moses		Mar 20, '88	Baltimore University of Md	"
Fordham John		" 18	85 Baltimore Medical College	" 19, '89
Gettel Edwin H		April 1 '80	Hahnemann Medical College	" 22, '89
Wallace Charles J	Camden	"	"	" 27, '89
Kinstinger Wm H		" 4	89 Jefferson Medical College	May 7, '89
Goodwin, Eugene B		May 1, '88	University of Pennsylvania	" 8, '89
Horning, Frank I		" 1	"	" 7, '89
Bulcom Lafayette		Feb 16, '64	University of Buffalo	June 8, '89
Shivers, B H		April 6, '84	Hahnemann Medical College	" 6, '89
Oman Wm F H		" 1	88 Jefferson Medical College	July 12, '89
Martin William		"	Jefferson Medical College	" 26, '89
Dannan Emma A		June 26, '89	Phil. Univ. of Med. & Surg	Aug 7, '89
Riehl G F		April 3, '89	Jefferson Medical College	Oct 6, '89
Katon, Frederick M		" 24	89 Hahnemann Medical College	" 14, '89
Phillips, Horace		May 1 '89	University of Pennsylvania	" 26, '89

CAPE MAY COUNTY

Hand, Zephieard	Cape May C. H	Mar. 1, '80	Penn. Col. Dent Surg.	June 22, '89
Thatcher, Jesse Williams	3300 Hamilton St, Phila	In Latin Mar 10, '70	Hahnemann Med. Col. Phila	June 28, '89

CUMBERLAND COUNTY.

NAME OF PHYSICIAN.	P.O. ADDRESS.	DATE OF DIPLOMA	INSTITUTION CONFERRING DIPLOMA - ITS LOCALITY.	WHEN COPI WAS DEP'D
Bacon, Lafayette.	.	Feb. 15, '64	Buffalo Medical University.	June 7, '80
Bancroft, Augustinus A.	.	Feb. 27, '69	Hahnemann College, Phila	" "
Day, S. T.	Port Norris	Apr. 8, '80	Academia Fenn. Martia	May 7, '80
Dunlap, Mary J.	Vineford,	"	'86 College of Medicine, Phila	Aug 13, '80
Hansel Adolph.	"	May 22, '88	Freiburg Col. Germany	Feb 8, '80
Howard, Emory E.	Rosenhayn	June 4, '84	University of Vermont	Mar. 21, '80
Lyon, Melvern S.	Millville	Apr. 4, '89	Hahnemann Med. Col., Phila.	May 24, '80
Taylor, A. C.	Vineford.	Ap. 6, '80	University of Pennsylvania	Oct. 12, '80

ESSEX COUNTY.

Belz, Wilhelmina M. I.	.	Nov 7, '88	College of Midwifery	Dec. 31, '80
Balley, William Otto	.	Mar. 12, '89	Univ. Med. College, N. Y.	Mar. 14, '80
Bacon, Lafayette	.	Feb 16, '64	University of Buffalo	April 5, '80
Bancroft, Augustinus A.	.	" 27, '69	Homeopathic Med. Coll., Pa	" "
Baldwin, Mary H. E.	.	" 14, '78	Eclectic Med. Coll., N. Y.	May 23, '80
Crawley, Adelle B., now Dake	.	Mar. 24, '86	Ho. Med. Coll. Cler'd, O	" 9, '80
Case, Levi W.	.	" 12, '80	Col. of Phys. & Surg., N. Y.	June 14, '80
Coldus, James W.	.	" 23, '83	Bellevue Hos. Med. College	Oct. 16, '80
Calabrese, Bern., Physician	.	" 10, '81	University of Naples, Italy	Nov. 6, '80
Calabrese, Bern., Surgeon	.	June 16, '82	" "	" "
Dawson, Elizabeth K.	.	" 21, '88	Tr. Sch. for Nurses, Newark	Jan. 28, '80
Francis, Richard Foster	.	" 24, '88	Harvard Medical College	Feb 16, '80
Fritzsche, Charles H.	.	Dec 21, '57	Kell Med Univ., Germany	" 18, '80
Fetter, Nathaniel	.	Sept 30, '81	Kain Pad Univ., Austria	June 26, '80
Folta, Collet	.	April 2, '86	Hahnemann Med. Coll., Pa.	July 13, '80
Goldberg, Leo Gustave	.	May 24, '87	Univ. of Heidelberg, Germ.	Feb. 14, '80
Galloway, Alonzo	.	April 12, '89	Druid Ban. Buffalo, N. Y.	June 23, '80
Guggen, John, Mar	....	Mar. 29, '89	Fulda Mass., Vertsberg, Ger.	Oct. 21, '80
Hadley, Charles H.	.....	June 1, '81	Boston University, Mass.	Nov. 30, '80
Happe, Catharine	.	Dec 29, '88	Col. of Mid., N. Y.	Feb 11, '80
Hobbes, William Laure	.	Mar 11, '80	Bellevue Hosp. Med. Coll.	Sept 9, '80
Jordan, Philip J.	.	May 28, '72	New York Medical College	April 10, '80
Laure, Frank B.	.	June 1, '80	Eccl. Med. Coll., Cin., O	May 29, '80
McFarland, David W.	.	Mar. 6, '85	University City of N. York	Jan. 4, '80
Mussett, Maria M.	.	June 20, '88	Tr. Sch. for Nurses, Newark	" 28, '80
Magies, James M.	.	May 12, '87	Col. Phys. & Surg., N. Y.	Mar. 2, '80
Morrison, Caldwell	.	" 11, '89	Home. Med. Coll., N. Y.	July, 6, '80
Mahler, Wilhelmina	.	" 24, '89	Col. Mid., Heidelberg, G.	" 16, '80
McDowell, George W. A. B.	.	April 15, '86	Home. Med. Coll., N. Y.	Aug. 2, '80
Needer, Andrew Lynn	.	May 18, '82	" "	Nov. 24, '80
Newton, Richard C.	.	Mar 1, '77	Col. Phys. & Surg., N. Y.	Dec. 5, '80
Parker, Charles Benjamin	.	" 11, '89	Bellevue Hosp. Med. Coll.	Apr. 1, '80
Rodemart, William Chas.	.	" "	" "	Mar. 12, '80
Rusby, Henry S.	.	May 13, '84	University of New York	April 2, '80
Ripley, Charles D.	.	June 13, '89	Col. Phys. & Surg., N. Y.	June 27, '80
Starkweather, Charles F.	.	Oct 16, '66	Berk Med Coll., Mass.	Feb. 7, '80
Shick, William Franklin	.	May 1, '88	University of Pennsylvania	May 10, '80
Whitely, Albert B.	.	Mar. 17, '83	Penn Medical University	Feb. 11, '80
White, Henry D.	.	May 12, '87	Col. Phys. & Surg., N. Y.	May 4, '80
Webster, Frederick	....	June 13, '89	" " " " Col.	June 15, '80
Wegner, Augusta S.	.....	July 31, '88	Col. of Midwifery	" 17, '80
Welter, Alfred	.	June 13, '89	Columbia College, N. Y.	" 21, '80
White, William H.	.	"	Affidavit of 20 yrs. practice	July 27, '80

GLOUCESTER COUNTY.

Lefevre, Adrinetta L.	.....	1889 Women's Med. Col., Phila.	May 31, '80
Parker, T. E.	Woodbury	" Hahnemann College,	Nov. 8, '80

HUDSON COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY.	WHEN COPY WAS DEP'D.
Aden, Fremont.....		Mar. 9, '85	N. Y. College of Dentistry	April 28, '89
Brokhaus, Maria H.....		April 23, '89	N. Y. Med. A. for Women	April 26, '89
Balcom, Lafayette.....		Feb. 23, '64	University of Buffalo.....	May 10, '89
Bancroft, Augustus A.....		Feb. 27, '69	Penn. Homeo. Med. Col....	May 10, '89
Bowen, Horace.....		May 14, '89	N. Y. Homeo. Med. Col....	June 15, '89
Brownell, Carl De Wolf.....		Mar. 9, '88	University of New York....	June 17, '89
Barnes, Charles A.....		Feb. 8, '80	Maine Medical College.....	Oct. 16, '89
Broughton, Mark A.....		June 28, '89	Med. & Surg. Col. of N. J.	Aug. 15, '89
"		Mar. 6, '81	Eclectic Med. Col. of N. Y.	Dec. 4, '89
Clausen, Bernard.....		April, '58	N. Y. Homeo. Med. Col....	Mar. 11, '89
Connell, John.....		May 14, '89	N. Y. Homeo. Med. Col....	June 5, '89
Culver, William.....			Affidavit 20 years practice..	Aug. 21, '89
Davis James (Jacobum).....		Feb. 8, '83	Eclectic Med. Col. of Maine	May 15, '89
Drossner, Morris.....		Mar. 19, '63	Univ. of Greifswald, Ger....	May 20, '89
Dennis, Leban.....		Mar. 8, '66	Col. of Phy. & Sur., N. Y.	July 26, '89
Davies, John H.....		June 28, '89	Med. & Sur. Col. of N. J..	Oct. 8, '89
Elmore, William T.....		Nov. 20, '88	Dartmouth Col., New H....	July 19, '89
Fopeano, Joseph E.....		Mar. 14, '89	Long Island Col. & Hos....	April 4, '89
Faison William F.....		June 27, '88	University of Virginia.....	June 17, '89
Finerty, Joseph W.....		May 14, '89	Homeo. Med. Col. of N. Y.	Sept. 11, '89
Graham John H.....		Mar. 3, '88	St. Louis Col. of Phy. & S..	Feb. 7, '89
Gotwols, Alfred L.....		June 7, '88	Amer. Ec. Med. Col. of O.	July 23, '89
Gray Daniel T.....		Mar. 5, '52	University of New York....	July 26, '89
Gray James E.....		Mar. 6, '85	University of New York....	Dec. 4, '89
Hazzan, Elias B. G.....		June 28, '89	Med. & Sur. Col. of N. J..	Aug. 6, '89
Hill, Christopher D.....		June 27, '88	University of Virginia.....	Dec. 20, '89
Kahn, Arthur.....		June 11, '86	Fred. William U. of Berlin	Sept. 16, '89
Kirchgessner, Emil.....		June 28, '89	Med. & Surg. Col. of N. J..	Sept. 18, '89
Lange, Oscar.....		Mar. 4, '89	University of New York....	Mar. 22, '89
La Vance, George W.....		Mar. 11, '89	Bellevue Hos. Med. Col....	Aug. 13, '89
Lawrence Elijah W.....		April 28, '63	Univ. of Med. & Sur., Phil.	Oct. 4, '89
Montmarquet, Joseph D.....		June 13, '89	Col. of Ph. & Sur. of N. Y.	June 14, '89
Lean, John J. M.....		April 22, '88	Halifax Med. Col., NS....	Oct. 26, '89
Opdyke, Charles P.....		May 14, '89	N. Y. Hom. M. Col. & H.	April 22, '89
Potter, George E.....		June 1, '80	Amer. Ec. Inst. of Cin....	June 1, '89
Pfenning, August C.....		June 13, '89	Col. of Phy. & Sur., N. Y.	June 18, '89
Pindar, David B.....		June 13, '89	Col. of Phy. & Sur., N. Y.	Aug. 6, '89
Pfingsten, Gustav.....		June 28, '89	Med. & Surg. Col. of N. J.	Aug. 6, '89
Sanborn, Noah.....		Sept. 12, '61	Dartmouth College, N. H..	Mar. 29, '89
Smith, Hulda G.....		Feb. 3, '78	N. Y. Medical College.....	June 6, '89
Smith, George R.....		June 28, '89	Med. & Surg. Col. of N. J.	Oct. 8, '89
West, John E.....		Mar. 1, '67	Medical College of Ohio....	Feb. 9, '89
Wolfstien, Louis.....		Mar. 14, '89	Long I. Med. Col. & Hos...	Mar. 28, '89
Walter, A. P.....		Mar. 4, '84	Med. & Surg. Col., Bal....	Aug. 29, '89
Wilkinson, Walter.....		Oct. 11, '89	Bel. Hos. Med. Col., N. Y..	Nov. 4, '89

HUNTERDON COUNTY.

Fahr, John Wm.....	Milford.....	April 5, '87	Jefferson Med. Col., Phila.	July 2, '89
Johnson, Thomas.....	Whitehouse.....		(affidavit filed)	Aug. 9, '89
Nixon, Warford L.....	Riegelsville.....	April 3, '89	Jefferson Med. Col., Phila.	May 4, '89
Swift, George Parsons.....	Lambertville.....	Feb. 28, '77	University of Boston, Mass.	May 21, '89

MERCER COUNTY.

Abbott, Josephus B.....	Trenton.....	'87	Philadelphia, Pa.....	Mar. 13, '89
Balcom, La Fayette.....		Feb., '6		" 23, '89
Wilbur, William L.....			University of Pennsylvania	Apr. 10, '89
Silver, George Addison.....		'81		" 18, '89
Norton, H. G.....			University of Pennsylvania	" 27, '89
Sches, W. J.....			"	May 14, '89
Emke, W. J.....	Trenton.....		University of Michigan....	July 19, '89
Satterthwait, Laura H.....	"	'88	Pennsylvania.....	Sept. 9, '89

MIDDLESEX COUNTY.

NAME OF PHYSICIAN	P. O. ADDRESS	DATE OF DIPLOMA	INSTITUTION CONFERRING DIPLOMA	ITS LOCATION	WHEN COPY WAS OBT'D
Bancroft, Augustine		Feb. 27,	60 Huntern Med. Col.	Philad.	April 18, '89
Balcom, Lafayette		27,	64 University of Buffalo,	N. Y.	
Brought, Frank F.	New Brunswick	June 18,	80 College Med. & Surg.,	N. Y.	June 14, '89
Davis, Edward B.		18,	80 Col. of Phys. & Surg.,	N. Y.	11, '89
Schario, Mary L. J.	Savreville	20,	80 College of Midwifery,	N. Y.	1, '89
VanDyke, C. D. W.		Feb. 4,	79 Albany Medical College,		May 2, '89
Miller, Chas. N.		May 14,	88 Bellevue Hospital Med. Col.		April 2, '89
McKenzie, Jr., W. V.		18,	84 Columbia College,		July 15, '89
Mass, Chas. T.	New Brunswick	Mar. 11,	80 University of the City of N. Y.		Aug. 15, '89
Miller, Elijah		May 1,	80 University of Pennsylvania		Sept. 7, '89

MONMOUTH COUNTY.

Brewer, Joseph S.		Feb. 15,	'82, Bellevue Med. Col., N. Y.	June 12, '89
Booth, Joseph A.		4,	'89 University of New York	26, '89
Bowen, George W.		12,	'72 University of Pennsylvania	July 8, '89
Baumenter, Allen D.	Asbury Park	1,	'80 Hahnemann Medical College	Aug. 18, '89
Carroll, Margaretta C.	Ocean Grove	8,	'81 N. Medical College, N. Y.	July 13, '89
Forthner, George R.	Asbury Park	Sept. 18,	'87 Baltimore Medical College	26, '89
Forthner, Ida E.		Mar. 7,	'89 Penna. Medical University	
Hendrickson, Henry A.		4,	'80 New York University	Mar. 10, '89
Houghbee, Ezekiah S.	Monmouth Beach	18,	'80 Bellevue Hos. Med. College	June 18, '89
Hughes, Elmer F.		Apr. 10,	'80 Jefferson Medical College	July 3, '89
Hasbrouck, Stephen J.	Ocean Beach	Feb. 1,	'80 N. Y. Hosmer Medical Col.	6, '89
Krough, John C.		Jan. 18,	'80 Columbia College	Oct. 1, '89
Maxwell, Jacob C.		Feb. 1,	'80 University of Pennsylvania	May 10, '89
Peck, F. C.		Feb. 28,	'79 Medical College of Ohio	Mar. 11, '89
Smith, Robert Meric		Feb. 18,	'80 Col. of Phys. & Surg. Baltimore	May 7, '89
Smith, J. Selzer,		1,	'82 Jefferson College	June 9, '89
Sonville, Mathias		Apr. 1,	'80 University of Pennsylvania	
		Oct. 18,	'84 Syracuse University	July 9, '89
Thompson, George S.	Asbury Park	Oct. 20,	'78 Dartmouth College	Jan. 21, '89
Williamson, Alexander		Feb. 14,	'80 University of Pennsylvania	April 28, '89
Warner, David	Asbury Park,	20,	'82 Bellevue Medical College,	July 22, '89
Ward, P. W.		4,	'80 University of New York	2, '89

MORRIS COUNTY.

Adair, S. H.	Summit	Mar. 15,	'80 Col. of Phys. & Surg. Maryland	Nov. 26, '88
Burt, Chauncey Rea,	Morristown	June 27,	'80 Harvard University	Apr. 10, '89
Burns, S. W.	Chester,	May 1,	'87 University of Pennsylvania	2, '89
Crowfoot, Dander M.	Mt. Olive	Mar. 1,	'88 University State of N. Y.	Oct. 1, '88
Foster, George H.	Rockaway	18,	'89 Bellevue Hos. Med. College	May 11, '89
Hay, Charles M.	Morris Plains	May 1,	'88 University of Pennsylvania	Dec. 11, '88
Mead, L. I.	Morris Plains	1,	'86	Oct. 1, '88
Smith, Wm. A.	Boonton,		By affidavit 20 years' prac.	Nov. 24, '89

OCEAN COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY.	WHEN COPY WAS DEP'D.
Weeks, Carlisle B.....	Forked River..	Mar. '80	Jefferson Med. Col., Phila.	Jan. 10, '89
Sinclair, Benjamin F.....	Lakewood.....	Dec. 7, '88	N. Y. Col. of Magnetics...	Feb. 2, '89
Allen, Howard.....	New Egypt....	Mar. 13, '89	Med. & Chir. Col., Bal...	Mar. 26, '89
Kirk, Irvin W.....	Manchester....	Mar. 30, '89	" " " " " " " "	April 3, '89
Carlisle, Robert James.....	Bay Head.....	Mar. 13, '84	Bell. Hos. Med. Col. N. Y.,	June 20, '89
Price, William Henry.....	Island Heights.	May 1, '89	University of Pennsylvania	June 29, '89

PASSAIC COUNTY.

Bowden, David Thomas...	Paterson.....	Oct. 8, '86	University of Maryland...	Apr. 11, '89
Brockway, Almond Crandell	" " " " " "	Mch. 4, '89	University of New York...	May 23, '89
Brown, James Alexander ..	" " " " " "	June 13, '89	Col'a Col. & Phy. & Sur. N. Y	June 17, '89
Bancroft, Augustus A.....	" " " " " "	Feb. 27, '89	Homœopathic Med. Col., Pa	Sept. 18, '89
Cunningham, Wm. Patrick	Passaic Bridge,	Mch. 14, '87	Bellevue Hospital Med. Col.	Nov. 10, '88
Craig, Charles.....	Paterson.....	Sept. 21, '82	Detroit Medical Col., Mich.	Jan. 23, '89
Demarest, Frederick F. C.	" " " " " "	Mch. 12, '88	Bellevue Hospital Med. Col.	" 28, '89
Dunning, Charles.....	Passaic " " " "	May 12, '87	Columbia Medical College..	Feb. 6, '89
Fisher, George.....	Paterson.....	Jan. 10, '89	Wurtz'g Bav. Acad. Jul. Max	July 9, '89
Gladwin, Daniel W.....	" " " " " "	April 16, '86	American Health College...	May 17, '89
Guggenheim, Max.....	" " " " " "	May 19, '87	Med. Col. Univ'y Wurt'g Ger	Aug. 26, '89
Hadley, Jacob Francis.....	Passaic.....	Mch. 14, '89	Long Island College Hospit'l	July 24, '89
Kiersted, Christopher.....	Little Falls....	Dec. 31, '42	Med. Society of State of N. Y	May 17, '89
McBride, Andrew Francis.	Paterson.....	June 13, '89	Col'a Col. & Phy. & Sur. N. Y	June 15, '89
Matzinger, William.....	" " " " " "	May 19, '80	University of Basel, Switz'd	Oct. 28, '90
Putney, Alfred Lyman.....	Passaic.....	Mch. 1, '70	Bellevue Hospital Med. Col.	Apr. 12, '89
Sternberg, Fred'k Alexan'r	Paterson.....	" 3, '89	N. Y. Eclectic Medical Col.	" 3, '89
Smith, William A.....	" " " " " "	" " " " " "	Affidavit of 25 yrs. prac. filed	Oct. 28, '89
Wemarsay, Edward H.....	West Milford ..	" " " " " "	Affidavit filed June 13, '89...	" " " " " "
Zimmerman Charles.....	Paterson.....	Mch. 6, '84	Homœopathic Med. Col., Ill.	Aug. 1, '89

SOMERSET COUNTY.

Sutton, Edward.....	Somerville.....	May 10, '88	Columbia Medical College..	Mar. 26, '89
Gorton, W. H.....	North Plainfield	" 12, '81	Jefferson Medical College..	May 10, '89
Phinney, Charles Fremont.	Bound Brook...	Aug. 14, '86	Vermont Medical College..	" 11, '89
Gaston, Miss M. E.....	Somerville.....	May 15, '88	Penn. Medical College.....	July 9, '89

SALEM COUNTY.

MacNell, William.....	Salem.....	Feb. 24, '88	Penn. Col of Dent. Surgery	Mar. 23, '89
Barnart, Newton B.....	Woodstown....	April 26, '89	Hahn. Med. College, Phila.	Sept. 28, '89
Freedom, Ellis.....	" " " " " "	" 30, '89	Jefferson College, Phila....	" " " "
Patrick, Gulelman J.....	" " " " " "	June 4, '89	University of Pennsylvania	June 4, '89
Groof, F. Humphrey	Pennsgrove....	March '76	Terrae-Mariae, Baltimore..	Nov. 2, '89

SUSSEX COUNTY.

Hood, Bruno.....	Newton.....	May 12, '85	Univ. & M. & S. Col., N. Y	Jan. 29, '89
Armstrong, Edward C.....	Coleville.....	Mar. 4, '89	University Col. of N. Y....	May 14, '89

REPORT OF THE BOARD OF HEALTH.

UNION COUNTY.

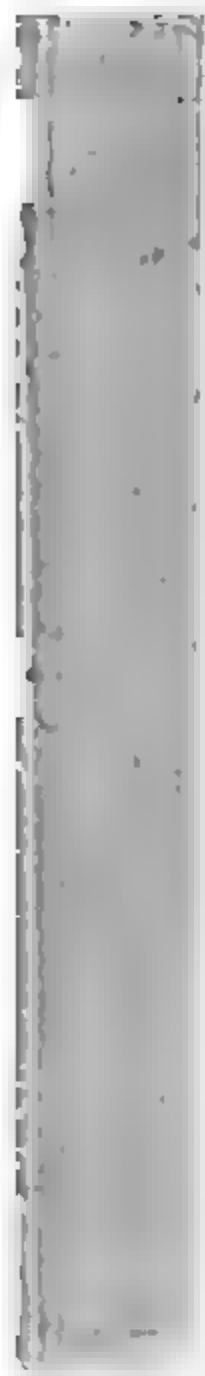
NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY	WHEN COPY WAS DEPD
Alba, J. A.	Plainfield	June 13, '80	Col. of Phy. & Sur., N. Y.	June 25, '89
Banker, Pierre A.	Elizabeth	Mar. 12, '79	Homeo. Med. Col., N. Y.	Mar. 1, '89
Bancroft, Augustus A.	"	Feb. 27, '69	Hahnemann Med. Col., Phila.	May 1, '80
Baleon, Lafayette	"	Dec. 14, '84	University of Buff., N. Y.	May 1, '89
Francis, Joseph M.	Brooklyn	May 2, '72	Amer. Elec. Col. of Ohio	May 11, '80
Garton, W. F.	Plainfield	Mar. 12, '81	Jefferson. Col. of Penn.	Jan. 4, '85
Green, James Sprat	Elizabeth	June 13, '80	Col. of Phy. & Sur., N. Y.	July 17, '89
Martin, Arthur Jacob	"	Mar. 11, '89	Bell. Hos. Med. Col. N. Y.	Mar. 17, '89
Terrill, Louise F.	"	April 16, '89	Col. C. of Midwifery, N. Y.	July 12, '89

WARREN COUNTY.

Burd, William J.	Belvidere	—	'86 University of Pennsylvania	May 1, '89
Fahr, John W.	Milford	—	'87 Jefferson Med. Col., Phila.	July 4, '89
Miller, John	Hope	—	'88 University of New York	Jan. 15, '89
Shipman, William	Shiner's P. O.	—	'88 Jefferson College, Phila.	Nov. 24, '89

R E P O R T
OF THE
BUREAU OF VITAL STATISTICS
OF THE
STATE OF NEW JERSEY
FOR THE
Statistical Year from July 1st, 1888, to July 1, 1889,
WITH CLIMATOLOGY, ETC.

By **EZRA M. HUNT, M. D., D. Sc.,**
Secretary and Medical Superintendent of Vital Statistics.



REPORT ON VITAL STATISTICS

BY THE MEDICAL SUPERINTENDENT OF VITAL STATISTICS.

INTRODUCTION.

The subject of vital statistics is one in which there is not much new to be said but as to which in the various tables that can be compiled and the conclusions that can be claimed therefrom, there is a wide field for the exercise of judgment and for the skillful tabulations of results. In previous reports we have so fully outlined the history, and the methods of this study that little is to be added in that direction. J. T. Billings, M. D., L.L.D., U. S. A., has recently given a course of lectures on vital and medical statistics which furnishes a valuable outline of the principles on which they rest and discusses the most approved methods for the collecting of the facts and for an intelligent use of the material secured.

We quote as follows some of the statements most important to those engaged either in furnishing the data or in dealing with it:

Those who are engaged in the collection and compilation of official mortality and vital statistics are often at first the most sceptical as to their accuracy and utility, for their attention is so frequently and forcibly drawn to errors in the individual data that they conclude that the whole mass is unreliable, and the difficulties in the way of obtaining complete and reliable figures are seen to be so great that they incline to give up the whole matter in despair. Continued study of the subject, however, shows that many valuable conclusions or suggestions can be derived from imperfect data, and that in large masses of figures the errors either tend to neutralize each other, or to produce a constant effect in one direction which can be calculated and allowed for, so that those who have had the greatest experience are most convinced of their value. It is true that, in statistics, the inferences cannot be more accurate than the data on which they are founded, but we do not look for scientific exactness from them so much as for an estimate of probabilities.

Other errors "are not so frequent as are the errors of involuntary misstatement and misrepresentation into which those not familiar with methods of collecting and tabulating statistics are so liable to fall."

The object of vital statistics is to classify and arrange the facts relating to the quality and character of human life under different circumstances, for the purpose of determining the effect upon it of each of these circumstances taken singly, or of two or more of them acting together. The results thus obtained form an important part of the scientific foundations of sociology of political economy, and of preventive medicine. It deals with masses of men and not with individuals, and its conclusions are, for the most part, applicable only to large bodies of people; yet its data are derived from individual records, and its results are accepted in many cases as a sufficient guide for individual action.

These abstracts are given out of their consecutive order as supplementary to details given in previous reports.

As illustrative of the indispensable relation between the collection of vital statistics and the study of sanitary problems we quote the following language from a recent address of Sir Edwin Chadwick, whose entire life, now over 90 years, has from an early age been devoted to the promotion of sanitary progress.

"It is no utopia that death rates in towns under the separate system of drainage have been reduced by one-half through the work of the sanitary engineer alone. It is no utopia that the death rate at Rugby, for example, which was one of the towns first treated by our first general Board of Health, was 24 in 1,000, and is now only 12. It is no utopia that at Salisbury the old death rate, which, at the beginning of the century, was as high as 40 in 1,000, is now about 16; or that at Croyden and a number of other places, death rates of 24 in 1,000 now average 15. These reductions have been effected by the system of circulation versus stagnation, which is yet to be made generally understood, to be by constant and direct supplies of water, by the removal of the fouled water through self-cleansing house drains and self-cleansing sewers, and by the removal of the refuse, fresh and undecomposed and unwasted, on to the land."

"Various experiences in this country by these factors alone, have established with such certainty that a contractor may contract with safety for the attainment of sanitary results, and by them the general death rate may yet be reduced by 10 in 1,000. Beyond the reduction of the annual death rate from the work of the sanitary

engineer, nothing is yet commonly expected or sought for. I had, however, early anticipated that the reduction of the annual death rate would be accompanied by an advance of the life rate, and I have recently obtained from the Registrar General examples of what that advance may be. I find that at Rugby the life rate has been extended to all living there, of every class, by eight years, or from thirty-three to forty-one years. At Hastings the duration of life has been advanced for males an average of five years and five months, but for females eight years and one month. At Lerk it has been extended by ten years. At Croyden and Salisbury, and other places, the extension has been from six to seven years, females, as a rule, obtaining by our science the greatest share. That is to say, some eight years more of life rate, more of painless life, more of health and strength and beauty. These extensions of the life rates, as yet little known and regarded, belong, however, to all classes; both to the well to do and to the lowest. Of the wage classes, whose life rate is largely the lowest, the extension will be found to be the greatest."

Every year gives encouraging increase of correctness in the returns of marriages and deaths and some encouragement as to births. The law by which assessors can collect any that physicians or midwives have omitted and also report who was in attendance, aid much in all country districts, but in our cities no doubt many escape registration. It is true that applying certain calculations we can approximate the birth rate for purposes of comparison of mortality and natality, but it would be much better if more complete returns were secured. This we believe could be done if the law made some provision by which those who take the school census each year should also obtain a record of each birth.

From the fact that this State has a quinquennial census, taking with equal or greater accuracy than the decennial census, furnishing details as to numbers of families, etc., we are able to know actual population better than most of the States. At first it was conceived that it would suffice to be governed by these data making due local allowance for corrections which municipalities would themselves reckon for local purposes. But it has since our first decennial record been deemed best to reckon approximate populations for intermediate years. These will begin with the present report.

We have also made some change in the method of comment on the general death rate and special diseases.

THE MOUTH CAVITY AND ITS CONTAINED STRUCTURES AS RELATED
TO DISEASE.

It has not escaped the attention of any practitioner, that several of the most common and serious of human diseases have earliest manifestation in the mouth and fauces. It is here that the infant with its aphthæ or thrust often shows its first departure from health, and through all the years to old age it is the harbor for many a parasite. Parotitis has here its incipency, and all the varied forms of tonsillitis first exhibit inflammatory, follicular or septic symptoms not confined to one locality.

Scarlet fever, diphtheria and erysipelas and to some extent whooping cough, measles and small pox have here very early manifestations. Since we have come to know so many diseases to be derived from the lodgment of infective particles received through the nose or mouth into the buccal cavity, it is well that attention is turned to a more minute study of the anatomical and histological structure of all this region. This is all the more important because the mouth is more and more being recognized as the pandora box of the contagious diseases. Common sore throat is claimed to be transmissible to many directly exposed so as to inhale the breath. Dr. Harb-Brown is convinced of the communicability of forms of tonsillitis, and Dr. Lees, of St. Mary's Hospital, London, says: "Many ordinary catarrhs are distinctly contagious. We do not need at present to add to these the list of transmissions more fully recognized, but it is proper that we should so study the construction of the mouth, throat and adjacent membranes and organs as to know why here is the great source and repository of contagious.

As to the tonsils ordinarily so called, we no longer look upon them as useless relics, to indicate a connecting link between man and other animals or as located merely for the purpose of lubrication. The mucous membrane filled with crypts, the thickly located lymph follicles and the abundant plexus of lymphatic vessels and of vessels for blood supply show preparation for an activity of service similar to that of bodies, we designate organs. This lymphatic tissue is so abundant and the arterial supply so profuse

as to give great opportunity for minute particles of any kind to reach the blood through the lymphatic system. Dr. Hingston Fox calls them "nurseries of young cucocytes."

This lymphoid tissue arranged as follicles is so abundant as to make quite secondary the secretive function of the mucous glands shared in common with the rest of the mucous membrane of the month.

Dr. Fox who has paid great attention to the study of the structure and function of the faucial tonsils regards their chief function to be that of absorbents, absorbing buccal secretives and elements of food passing them and if so receptive absorbents of other particles brought in contact with them. He also speaks of them as forming a part of the blood manufacturing system. No one who in practice has had occasion to study the varying forms of so called follicular and too often septic sore throat but that has recognized the students character of the lymph tissue and the peculiar and rapid changes which occur.

But in addition we have come to recognize that this or an analogous kind of lymph tissue is very abundantly distributed in other parts of this buccal county. So much so that we now have the Lingual, the Pharyngeal, and the Discrete Tonsil is not so filled with crypts it has the same general histology. The Lingual Tonsil is the name giving to the aggregation of lymph follicles at the base of the tongue of the same construction a tissue as the others. The Discrete Tonsils in the Pharyngeal region show the same formation and action. Hence we have here a great outspread surface for absorption more than for secretion and in most intimate relative to the blood paths and to rapid modification of the blood.

Dr. Spicer, physician to the throat department of St. Mary's Hospital, London, has noted in addition the causes which give rise to acute sensibility and to some disorders of all this lymph structure. He refers to the extreme variations in the temperature, humidity and purity of air as breathed by house dwellers to the common mouth breathing, to septic particles, bad teeth, foul breath, etc., as causes of lymph follicle irritation and hypertrophy throughout the whole area under consideration, including the mucous lining of the nostrils.

Thus the lymph apparatus which so lines the mouth and is especially abundant about the fauces, becomes deranged as to its

secretions which catch the floating septic materials, give them a culture fluid such as causes local diseases or at once passes them through these absorbents into the general system.

A mouth unhealthy from any cause is the great hot bed for the vast multitude of specific diseases. We have here an extended apparatus for absorption as well as secretion. A bad state of the secretion seems in addition a soil in which infective particles are started into activity. Some have local trouble as well as the after effects of absorption.

"There can be little doubt that the tonsils are the sites where the poison of scarlatina, measles and diphtheria usually enter the system since they are the first and most constantly and often alone visibly affected and the lymphated glands in direct communication with them most marked soonest and most frequently involved." Spicer says that he has found follicular tonsillitis well marked in the crypts of the lingual tonsil. But the faucial tonsils are chiefly affected because more readily brought in contact with parhitis which enter through the mouth or nose. Many like Bretonneau, Certels, Loeffler, Empis, Kellogg, Avery, etc. contend that some or all of the more common microphytic diseases are first local, and that the degree of constitutional symptoms depends somewhat upon general infection from the local lesion and subsequent septic charges and absorption. In the incipency of these diseases and where there is local sepsis we have always believed local treatment to be of essential importance. At the same time substances which are antiseptic or resistful of septic charges and supporting to the system should be rapidly introduced.

But if the mouth's fauces offer great surfaces of absorption and secretion, we need still more definitely to consider all the means by which we can render the gate of disease as well as of life, the most effective to prevent the one and promote the other.

First of all, can we do anything to promote proper secretion or to correct such disordered secretion, as of itself may give rise to unhealthy condition by local irritation and by local absorption into the system. This is made far more important from the additional belief that even where the secretions cause no serious local affection and produce no serious result by their absorption, they are receptive of untold "*materies morbi*," and fertilize it into more dangerous growth.

We think we can claim that it is now the persuasion of very many practitioners, and of those especially who have given special attention to septic conditions in and about the fauces, that rinsing of the mouth, strict care of the teeth, and all the means for procuring a pure sweet breath should be sedulously used, not merely as an elegance of the toilet, but as a defence against disease. It is not now our object to specify either substances or modes of use. The range is through all spices, thymol, condimented herbs, and pronounced disinfectants. While water is the chief cleanser, where life and foods are artificial we may need some artificial adjustments. As to infectious particles from without, it has also been urged that a closed mouth much diminishes the risks, since the torturous course of the nasal openings and their adapted mucous lining tends to intercept much that more readily enters by the mouth.

As urged in a former report, it is on the same ground that spittle as well as sputa is always to be regarded as a secretion to be disposed of with care.

Next, can we do anything to suspend or diminish the absorbent power of the lymph structure or cause what is absorbed to be accompanied with restraining or corrective substances, such as will destroy the "*matenas morbi*," or so far affect it as to thwart its destructive activity.

In the view of a large class of practitioners this can and ought to be done.

Topical application to the throat, the frequent administration of such substances as the Tinct, Ferri Chloridum, Quinine, Potassium Chloride, etc, have these among their objects. There is difference of view as to the "*modus operandi*." Some think that the effect is chiefly due to protection of the surfaces of the mucous membrane; others to the corrugation which closes the openings of the *lacunæ* or glands; others to an effect produced on the blood and secretions unfriendly to the vigorous vitality of low forms of life.

But whatever may be the hypothesis as to the mode, no one who has carefully watched the records of treatment but that perceives that the chief means and remedies used do attempt to effect the local surfacees about the fauces and to introduce into the blood substances whose presence can be detected therein and which make it resistful of degrading changes. If the nitrate of silver solution is not employed or any other topical application, it is replaced when

a good authority directs that "six drams of perchloride of iron be dissolved in five ounces of sweetened water and the child take a dessert spoonful each hour for twelve hour, and after that diminishing the dose and prolonging the intervals." But if the case is not seen until the blood has become much affected then this local treatment is secondary or useless and while still using any medicaments that may restrain the absorption of the poison into the system, we seek to nourish and invigorate until the active but ephemeral invading life has been exhausted. So the higher life by its quality triumphs over the lower micrphytic life and those septic conditions which often result from or accompany it. It is still a very important inquiry as to how the benefit is obtained and what are the substances which will be operative.

In addition there are other aids that will suggest themselves. That at the very start if the local symptoms are acute and the secretions disturbed a cathartic is often of service. Special care must be taken as to the purity of the inbreathed air, frequent laving or rinsing of the mouth with blood fluids and the most thorough removal of all secretions that can be gotten rid of and the destruction of the spittle mucus or other material thus separated are also essential.

While giving due weight to all constitutional symptoms and to the need of constitutional treatment we would thus draw attention to the peculiar structure and relations of the great entrance way to the human system and ask that the possibilities of dealing with it so as to prevent disease, to arrest it at its first assault or to follow infective material rapidly with counteracting remedies be more fully investigated.

REMARKS ON MORTUARY DECENNIAL TABLES OF 12TH REPORT.

The Decennial summary of deaths from 1878 to 1888 as contained in the former report enables us to determine with approximate accuracy the number of deaths that occurred at various periods of life.

N. B. A note on page 473 is misleading, it having been misplaced from 416, as it has reference only to the Decennial Tables of Climatology.

The tables as found on pages 477 and 478 of that report as to the whole number of deaths present accurately the aggregate and

assigns each to their respective divisions by counties and cities to the amount of 228,151, the whole number of deaths being 230,709. The small difference being occasioned by supplements not received in time for full classification. As this extended to the period of ten years, it records what occurred as to deaths among a little over 11,000,000 of people, a part of it progressing in age through all this period, but being added to by births and varied by immigration and removal. While this is not the same as the tracing of the history of the same 100,000 people as Dr. Farr has done, it is valuable as fairly indicating the times at which death reaches a population progressive according to quite uniform laws. Out of 228,151 deaths the number occurring under one year was 53,494. Between the ages of one and five years 35,136 died. This gives an aggregate of deaths under five years of 88,630, or about three-eighths of the whole number of deaths; 21,974 died between the ages of 5 and 20; 69,485 died between 20 and 60; while 48,062 survived beyond 60 years of age.

While an analysis of deaths at shorter periods would be still more valuable, we thus get an idea of how many reach the productive period of life. As we turn to the record of cities of over 5,000 population we find that twenty-seven such cities represent a population of 701,428, leaving for the counties outside of cities 576,605. The deaths in these cities under one year were 35,752. Between the ages of 1 and 5, 23,645 died, giving an aggregate of deaths under 5 years of age of 59,397, out of 139,419 as the aggregate of those who died in these cities, or three-sevenths of the whole number of deaths. The difference between this three-sevenths and three-eighths in the country seems small, but this means quite a difference in the aggregate. It is also to be remembered there are a few of what might be called rural cities, such as Orange, Long Branch and Morristown. The deaths in these twenty-seven cities between 5 and 20 years of age were 13,770; between 20 and 60 years 44,325, and over 60 years of age 21,927.

For convenience of reference we herewith repeat the two condensed decennial tables :

Summary of Vital Facts from New Jersey Death Record, in Cities

CITIES HAVING OVER 5,000 POPULATION. Statistical Divisions.	DEATHS AT ALL AGES.						Total, including undefined.	Population, census of 1880.	Death-rate per 1,000.
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.				
Atlantic City	489	232	143	463	257				
Bordentown	148	88	78	318	269				
Burlington City	200	195	140	144	399				
Camden City	2,642	1,412	1,031	2,808	1,352				
Gloucester City	287	142	120	345	159				
Bridgeton	374	224	147	433	397				
Millville	379	287	183	308	280				
Newark	5,420	3,613	3,200	11,378	5,551				
Orange	720	490	202	948	427				
Bayonne	713	405	201	677	215				
Harrison	382	277	188	517	188				
Hoboken	2,355	1,573	728	2,883	838				
Jersey City	4,207	0,073	3,240	10,582	3,918				
Town of Union	624	36	200	461	191				
Chambersburg	392	200	140	398	188				
Trenton	1,522	842	549	1,910	1,204				
New Brunswick	837	488	423	1,015	749				
Perth Amboy	140	75	54	123	49				
Long Branch	68	30	24	72	46				
Morristown	226	155	102	451	396				
Passaic City	473	275	157	416	212				
Paterson	3,457	2,236	1,233	4,025	2,161				
Salem City	232	115	81	250	274				
Elizabeth	1,603	1,023	644	1,777	1,076				
Plainfield	358	193	132	388	361				
Rahway	238	143	108	404	371				
Phillipsburg	372	208	148	355	224				
Totals	35,752	23,645	13,770	44,325	21,927				

Cities are generally more unhealthy than their death-rates indicate since the population is in instead of removing the evils which distress and sicken those who remain. Hence, in many of our is a fair criterion of the health of locality, or at least should be considered for purposes of correction. question of labor and social science and art, as well as of comfort and hygiene.

of over 5,000 Population, for Ten Years ending June 30th, 1888.

PRINCIPAL CAUSES OF DEATH.

	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and Diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and cir- culation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.
...	31	...	26	2	15	63	13	284	197	101	129	116	78	126	73	33	6	18	
10	19	1	20	2	7	31	6	65	161	62	64	74	35	92	68	22	3	13	
20	31	2	15	2	14	112	10	141	230	124	64	104	69	124	90	22	5	19	
30	345	150	238	24	72	502	19	1,243	1,242	816	769	207	244	619	342	178	20	89	
40	23	...	22	5	10	87	1	134	189	73	88	45	24	70	41	13	3	15	
50	54	...	26	4	15	114	10	190	257	163	113	111	46	103	91	29	2	10	
60	64	...	48	18	14	125	6	224	266	148	92	71	42	75	66	33	4	11	
70	203	200	27	102	243	254	2,574	134	2,810	5,173	3,932	3,124	1,641	1204	2240	1419	736	73	344
80	14	58	79	22	32	161	17	321	413	394	244	150	122	142	116	61	7	38	
90	34	30	...	38	17	21	189	12	309	210	308	262	85	59	80	69	25	7	21
100	52	67	...	38	9	16	113	2	180	225	175	194	45	31	75	45	24	7	21
110	58	168	35	174	57	65	683	48	1,219	1,070	890	962	451	288	364	297	151	38	96
120	361	200	254	1218	284	261	2,043	106	3,950	4,032	4,003	2,074	1,440	932	1528	1380	523	62	340
130	28	60	4	61	17	9	328	6	259	202	182	168	91	38	70	61	35	2	23
140	10	31	...	49	20	15	78	5	190	201	131	87	62	34	75	51	34	4	22
150	51	138	19	171	44	56	326	34	666	993	564	379	307	198	456	292	123	26	68
160	28	98	9	78	18	46	289	16	474	515	317	235	200	165	213	158	113	12	23
170	8	6	...	8	2	2	47	1	67	57	41	46	14	11	25	18	5	3	3
180	4	5	...	1	...	3	21	1	47	37	17	15	12	10	25	28	8	1	3
190	19	20	1	12	1	11	69	4	151	215	111	78	64	59	191	77	40	6	15
200	13	50	...	24	13	13	88	8	242	193	162	160	72	51	78	58	17	12	20
210	145	269	42	537	110	92	626	51	1,763	1,919	1,432	1,139	655	461	662	575	244	30	153
220	13	30	3	7	...	10	52	1	105	161	96	43	49	25	84	60	27	7	9
230	101	90	4	152	33	72	431	20	737	756	653	585	349	168	399	259	114	14	219
240	13	31	1	31	10	9	66	5	209	205	167	99	85	70	111	57	31	9	10
250	18	25	3	42	6	6	33	10	102	209	159	90	96	38	112	64	31	3	11
260	8	35	1	46	7	9	94	8	133	157	112	124	60	39	99	71	20	6	16
270	1545	2486	558	4163	970	1151	9,193	546	17,257	19,667	15,355	12,379	6,899	4654	8235	5923	2702	391	1632

many of them much decreased for four months in the year, and thousands remove themselves cities, the death-rate for June, July, August and September, reckoned for the remaining population, so, health laws are a great defence to all, but especially to the working classes of cities. It is a

Summary of Vital Facts from New Jersey Death Record,

		DEATHS AT ALL AGES.					Total, including undefined.	Population, census of 1880.	Death-rate per 1,000.
COUNTIES.	Statistical Divisions.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.			
Atlantic	1,009	521	811	1,047	1,009	.....	.....	.....
Bergen	1,285	764	574	1,808	1,621	.....	.....	.....
Burlington	1,808	1,080	780	2,470	2,781	.....	.....	.....
Camden	2,588	1,454	1,308	4,080	2,585	.....	.....	.....
Cape May	312	142	109	344	487	.....	.....	.....
Cumberland	1,394	845	673	1,601	1,682	.....	.....	.....
Essex	10,888	7,008	4,110	14,086	7,656	.....	.....	.....
Gloucester	980	580	308	1,177	1,285	.....	.....	.....
Hudson	13,382	9,568	5,045	16,770	11,284	.....	.....	.....
Hunterdon	789	451	417	1,380	1,085	.....	.....	.....
Mercer	2,453	1,390	1,043	2,531	2,698	.....	.....	.....
Middlesex	2,097	1,268	997	2,720	2,143	.....	.....	.....
Montmouth	2,314	1,158	908	2,595	2,434	.....	.....	.....
Morris	1,540	1,017	607	2,542	2,383	.....	.....	.....
Ocean	405	234	184	672	624	.....	.....	.....
Passaic	4,171	2,691	1,544	4,671	2,790	.....	.....	.....
Salem	856	422	396	938	1,165	.....	.....	.....
Somerset	722	391	402	1,155	1,394	.....	.....	.....
Sussex	470	306	302	924	1,062	.....	.....	.....
Union	2,586	2,594	1,081	3,165	2,431	.....	.....	.....
Warren	1,158	740	896	1,549	1,335	.....	.....	.....
Totals.	52,494	35,128	21,974	69,485	46,062	.....	.....	.....

Total deaths in the State, for ten years (including supplements), was 230,709, and the average

Rates for short periods, or which deal with small numbers, are only approximate and sometimes or balance errors which practically disappear in large aggregates. So, five or ten years' analyses are the rest, is much more informative as to local causes affecting health, than the total deaths. See diarrhoeal diseases, consumption, and brain and nervous diseases of children

by Counties, for Ten Years ending June 30th, 1888.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and Diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.
11	85	12	50	16	44	182	24	559	524	208	268	235	158	312	234	88	10	45
153	133	8	156	23	47	227	29	842	783	702	432	452	241	484	322	127	24	69
82	293	19	143	26	87	405	47	913	1,285	785	513	623	314	736	589	223	37	101
187	550	181	324	31	113	676	30	1,791	1,971	1,186	1,150	737	165	984	575	239	30	143
15	51	..	35	7	20	42	8	146	159	129	80	75	31	193	101	57	3	10
27	210	1	126	28	38	353	32	682	1,611	585	433	362	200	478	330	140	20	57
529	1071	29	1237	304	347	3,093	194	4,863	6,477	3,129	3,792	2,446	1697	2,917	1,836	964	102	454
45	121	9	94	10	41	170	20	501	644	405	294	243	109	367	277	98	19	37
684	1285	250	1642	412	384	3,463	186	6,444	8,440	6,047	4,363	2,344	1538	2,442	2,027	833	144	524
61	114	2	102	19	28	215	32	332	684	453	222	417	187	606	287	158	18	65
96	255	23	289	43	102	482	71	1,162	1,781	1,038	651	627	366	1,155	574	274	49	123
125	228	12	222	43	101	572	33	1,155	1,300	879	585	506	361	619	474	232	38	92
107	183	7	146	45	102	443	32	1,183	1,209	943	549	715	394	615	592	213	40	99
161	180	1	237	40	67	386	46	697	1,066	959	492	533	290	1,101	444	188	50	110
12	85	1	22	17	21	85	12	193	302	191	132	116	65	186	149	48	9	33
216	344	42	608	129	114	571	67	2,174	2,311	1,773	1,417	850	584	365	716	298	45	190
43	136	8	44	10	34	191	28	413	589	372	168	198	116	347	212	90	18	38
70	61	3	83	22	30	201	25	353	534	413	189	302	180	466	259	122	23	46
56	91	..	86	7	20	112	16	210	461	389	139	255	106	315	166	88	12	44
197	206	9	271	56	104	689	46	1,219	1,426	1,203	900	672	346	789	480	232	35	102
57	135	11	213	25	28	269	33	502	690	613	394	343	193	493	312	113	32	71
394	8759	712	6108	1355	1872	12,800	1013	25,921	31,826	24,363	17,629	13,131	7539	14069	10935	4829	756	2456

death-rate 19.13.

misleading, since temporary causes may have been in operation, and small numbers do not eliminate much more important than any single year. The number of deaths before twenty, in proportion to also the number dying from zymotic diseases, and especially from fevers, croup, diphtheria,

Note first number at different ages.

Besides the representation of deaths by diagram and by numbers as found in the 12th report, it is also equally if not more important to notice the aggregate and relative number of deaths from principal diseases. As before noted so far as preventive measures are concerned the study of the comparative number of deaths from various diseases in various localities is more informatory, since many of those are indices of removable or preventable causes of disease. It has been said for instance that the number of cases of typhoid fever occurring through a long series of years is a fair criterion of the sanitary administration of a city. Small-pox points not so much to the general healthfulness as to the vigilance with which vaccination is enforced.

In the total of deaths, 230,709 for the ten years, we have as prominent, the following causes in the order of their frequency :

Consumption..	81,828
Diarrhoea Diseases.	25,921
Acute Lung Disease	24,883
Brain of Children	17,629
Adult Brain.....	14,059
Heart Circulation	13,131
Croup and Diphtheria	12,808
Digestive.....	10,935
Urinary	7,589
Scarlet Fever.....	6,106
Typhoid Fever.....	5,797
Cancer.....	4,829
Remittent Fever	3,694

Thus we see first of all consumption as taking the lead. Besides there are 24,383 deaths from acute lung diseases, or an aggregate of 56,209, or about one-fourth of all deaths from diseases of the lungs. These are to be divided between heredity, foul air and climated causes. Heredity itself is often the result of foul air and the exposures of ancestry thereto. The records of statistics are constantly showing impure air to be the most fruitful cause of disease, an evil which, although difficult to overcome, admits of diminution to an extent that would save thousands of valuable lives.

We are too apt to look to the suppression or prevention of epidemics as the chief sphere of sanitary administration, whereas the so-called pestilences all combined do not record an amount of de-

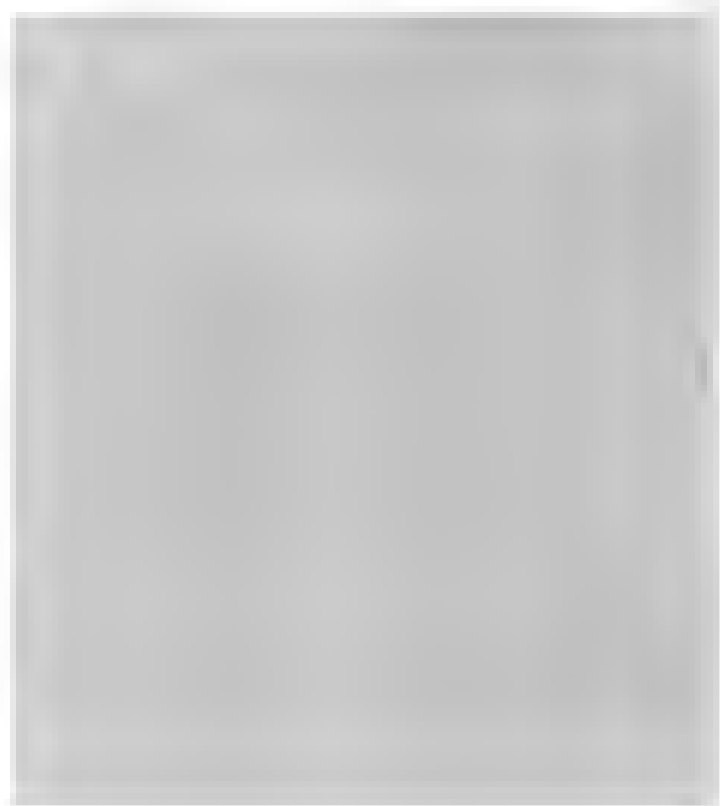
struction equal to the steady losses by reason of lung diseases. Our decennial total of what are usually rated as the communicable diseases, viz., diphtheria, 12,809; scarlet fever, 6,108; typhoid fever, 5,797; whooping cough, 1872; measles, 1,355; small pox, 712, is 38,652. Surely we have occasion to concentrate attention largely upon pulmonary diseases since they are so much in the majority. This is all the more serious because the entailment so often passes to persons of the next or subsequent generations, and so the actual number of deaths is not the full measure of the evil wrought.

What can we do to mitigate this great evil?

Diarrhœa deaths of children (25,921) present to us the whole subject of food, water, air and general regimen as relating to all under 20 years of age, but especially during the infantile years of life. We have come to a much better understanding than formerly as to the foods adapted to childhood, but there is still great lack in home management as to the foods provided for the young, and as to the details of regimen in the treatment of infantile diarrhœa. The former reports have treated at length of this subject and pointed to the most prominent indications, while the more recent mechanical and sanitary treatises on this subject are full of information.

Diphtheria was only reported in medical nomenclature as a distinct disease in 1855. We saw some of the first cases that were recognized in this country and that was not until 1857-8. Yet by rapid strides it has stalked onward with the tread of death, until its victims more than double that former dread of childhood, scarlet fever.

As to it, it must be said that very much can be done by removing filth and dampness, by the strictest isolation, by destruction of all membrane and sputa and by early and skillful medical and sanitary management. Success in thwarting epidemics or in dealing with individual cases, depends mostly upon precision of method or what Disraeli in another connection called a "genius for details." Where there has been exposure, the value of prophylactic medication is strongly advocated by some. Similar statements apply with equal force to scarlet fever and typhoid fever. Reference to the twelve former reports and especially to the more recent ones will show that we have gathered up the facts from year to year as to the sanitary management of those, as well as published special circulars as to them.



CLIMATOLOGY.

As in former reports we give the data as to climate for chosen localities in order that the relations of disease and death thereto may be compared.

As specified in our sixth report the choices of locality are made with reference to geological structure, soil, elevation and locality.

We have been compelled from time to time to vary some of the points of observation, but taken as a whole they fairly represent the various portions of the State.

HUMIDITY AS AFFECTING CLIMATE AND HEALTH.

Besides the influence of the earth, of latitude and longitude, etc., as affecting climate, much depends upon the general humidity of the atmosphere. This does not mean that damp or rainy days are unhealthy for all persons, but it does mean that conditions of health and certain diseases are affected by this element of climate. We all recognize the oppressive and in time the debilitating effect of very warm weather when the atmosphere is very heavily and several days laden with moisture. For many lung diseases it is now claimed that a very dry atmosphere is desirable. We are, however, too apt to judge of the condition of climate as to humidity by nearness to the ocean, by fogs or by some other external or visible sign. These are not always reliable since places near the ocean are sometimes relatively dryer than those more distant. In measuring the effect on climate we have most to do with what is known as relative humidity, and not so much with the absolute humidity. We quote the following brief outline of the difference and the effects:

"Let it be remembered," says Dr. Baldwin, "that the term relative humidity as used by meteorologists, is not the same as abso-

lute humidity. Absolute humidity determines the exact amount of vapor in the air when condensed into water; while relative humidity has relation to the amount of vapor in the air when it will be condensed after the point of *saturation is reached*. This point of saturation depends on the temperature and tension or force of vapor determined by the barometric pressure at the time of taking the observation. In relative humidity, the point of saturation is marked 100, and the figures in the column below 100 are the percentage of that quantity as existing at the time under a specific degree of temperature and tension of vapor. Therefore, the point of saturation is variable; as, for instance, when the thermometer is 50° and the barometer marks 30 inches pressure, a cubic foot of air then contains four grains and a fraction of water at the point of saturation, 100. When the temperature is 75° and the barometer the same as before, a cubic foot of the atmosphere then contains nine grains and a fraction where the air is saturated, but still marked 100. At the temperature of 100° , pressure as before, the cubic foot of air at the point of saturation will contain twenty grains and a fraction. Thus we see that the amount of moisture in the air at different temperatures varies in quantity. Therefore the percentages given of 100 and the different temperatures must also vary, so that the same figures, although they may be correct percentages of 100, do not indicate to us the absolute amount of moisture in the atmosphere, unless we know the temperature which regulates each point of saturation. Professor Henry, of the Smithsonian Institution, in an article on meteorology, says: "It is not upon the actual amount of vapor which the air contains at a given time or place that its humidity depends; but upon its greater or less degree of saturation." That air is said to be dry in which evaporation takes place rapidly from a surface of water or moistened substance. Hence, if relative humidity shows a small percentage of 100, the point of saturation in a climate where the absolute moisture is great, its effect in producing evaporation is the same as where the absolute humidity is less at the same percentage of 100, indicating saturation there."

Professor Tnydall says: "The observations of the meteorologists furnish important, though hitherto unconscious, evidence of the influence of vapor on the atmosphere. Whenever the air is dry, we are liable to extremes of temperature. By day in such places,

the sun's heat reaches the earth unimpeded, and renders the maximum high; by night, on the other hand, the earth's heat escapes unimpeded into space, and renders the minimum low. Hence, the difference between the maximum and the minimum is greater where the air is driest. Wherever drought reigns, we have the heat of the day forcibly contrasted with the chill of the night. In the Sahara itself, when the sun's rays cease to impinge on the burning sands, the temperature runs rapidly down to freezing, because there is no vapor overhead to check the calorific drain."

In certain conditions as to temperature a dry atmosphere may have its disadvantages as there are likely to be greater extremes of temperature between the day and the night.

**CONDENSED CLIMATOLOGICAL RECORD FROM JULY 1ST, 1888 TO
JULY 1ST, 1889.**

STATION, PATERSON, N. J.

**Latitude, 40° 55' N.; Longitude, 74° 11' W. Height of Barometer Cistern above
Sea Level, 84 feet.**

OBSERVERS—WM. FERGUSON, C. E., AND PROF. A. B. WIGGIN.

YEARS.	BAROMETER, (Reduced to 32 degrees.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches)*	Snow (days of).	Days when Precipitation equalled 0.1.	Cloudy days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1888.												
July				82.0	61.0	70.0			2.24		8	..
August				83.0	41.0	61.9			6.63		8	..
September				87.0	24.0	49.8			8.90		8	20
October				72.0	15.0	45.2			4.52		11	7
November				55.0	7.2	36.1			2.77	2	4	11
December									5.21		8	4
1889.												
January				65.0	14.0	36.8			4.84	2	8	9
February				61.0	0.9	27.1			1.98	8	7	10
March				61.0	19.0	40.7			1.86	4		10
April				77.0	36.2	51.4			6.07			14
May				80.0	41.0	62.7			2.87			
June				80.0	55.4	69.9			1.43			
For Year.				92.0	0.9	50.2			47.35			

*Including melted snow.

STATION, NEWARK, N. J.

Latitude, 40° 29' N.; Longitude, 74° 27' W. Height of Barometer Cistern above Sea Level, — feet.

OBSERVER, F. W. RICORD.

YEARS.	BAROMETER. (Reduced to 32 degrees.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equalled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1888.												
July	30.270	29.630	30.028	90.0	56.0	72.7	.....	N. E., S. E.	2.06	...	8	.....
August ..	30.300	29.510	29.998	92.0	52.0	73.5	.....	N. E. N. W.	5.07	...	11	.....
Sept.	30.370	29.570	30.031	80.0	42.0	64.0	.....		6.21	...	11	20
October ..	30.410	29.460	29.963	69.0	34.0	50.0	.....	N. W. S. W.	4.04	.....	11	.....
Nov.	30.700	29.270	30.126	70.0	18.0	45.3	.....	W., N. E.	4.19	.....	11	.....
December	30.540	29.120	30.022	54.0	11.0	35.0	.....	N. W. S. W.	3.27	.....	8	17
1889.												
January .	30.620	29.170	30.051	58.0	17.0	35.6	.....	N. W. S. W.	6.04	.....	11	.....
February	30.840	29.450	30.138	48.0	5.0	27.2	.....	N. W. S. W.	2.68	.....	8	.....
March. . .	30.510	29.190	29.906	63.0	26.0	40.5	.....	N. W. S. W.	3.31	.....	11	.....
April	30.450	29.240	29.990	79.0	35.0	51.3	.....	N. E., S. E.	6.24	.....	9	.....
May	30.380	29.640	29.978	88.0	42.0	63.6	.....	N. E., S. E.	2.43	...	8	.....
June	30.490	29.600	30.045	89.0	52.0	71.6	.....	S., W.	3.04	.....	10	.....
For Year.	30.700	29.120	30.021	92.0	5.0	52.5	.....	N. W. S. W.	48.58	.....	117	.....

*Including melted snow.

REPORT ON VITAL STATISTICS.

STATION, ATLANTIC CITY, N. J.

Latitude, $39^{\circ} 22'$ N.; Longitude, $74^{\circ} 25'$ W. Height of Barometer Cistern above Sea Level, 53 feet.

OBSERVER—WM BLYTHE, Signal Service.

YEAR.	BAROMETER, (Reduced to Sea Level)			THERMOMETER			Mean Humidity.	Prevailing Wind.	Rain (inches)*	Snow (days).	Days when Precipitation exceeded 0.01.	Cloudy days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1888.												
July . . .	30.23	29.66	30.036	91.0	55.0	69.6	81.8	S. W.	2.44	.	11	9
August . .	30.26	29.48	30.012	88.0	51.0	72.0	81.6	S. W.	4.20	..	11	6
Sept'ber .	30.33	29.61	30.067	80.0	37.0	64.4	85.3	N. E.	7.14		12	12
October . .	30.43	29.53	29.986	71.0	30.0	51.0	73.0	W. & N. W.	3.46	...	12	9
Nov'ber . .	30.73	29.20	30.120	69.0	26.0	47.0	84.4	W.	2.71	....	10	14
December .	30.63	29.07	30.074	53.0	12.0	36.2	80.2	W.	2.84	..	8	6
1889.												
January . .	30.62	29.19	30.068	52.0	19.0	37.1	84.4	W.	4.46	.	0	7
February .	30.83	29.41	30.170	48.0	2.0	30.0	76.0	W.	2.32		7	8
March . . .	30.51	29.37	29.910	60.0	27.0	47.0	78.0	N. E.	4.58		11	13
April . . .	30.50	29.28	29.972	70.0	32.0	48.0	81.0	S. W.	2.82	.	14	12
May	30.38	29.65	29.960	89.0	41.0	66.0	84.0	S. W. N. W.	2.82	.	13	9
June	30.44	29.08	30.060	88.0	50.0	66.0	87.0	S. W.	3.13	.	10	9
For Year.	30.63	29.19	30.035	81.0	2.0	51.4	81.8	W. & S. W.	42.91		125	113

*Including melted snow.

OF THE SEASONS.

Temperature
Spring, 47.7°
Summer, 69.2°
Autumn, 51.7°
Winter, 34.4°

Precipitation.
3.37 inches.
3.29 "
4.44 "
3.21 "

STATION, NEW YORK CITY.

Latitude $40^{\circ} 48'$; Longitude, $70^{\circ} 0'$; Height of Barometer Cistern above sea level, 185 feet.

OBSERVER—E. B. DUNN, Signal Corps.

YEARS.	BAROMETER. (Reduced to sea level.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches)*	Snow (days of).	Days when Precipitation equalled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1888.												
July.	30.26	29.60	30.010	89.9	55.3	70.5	69.8	S.	1.27	0	8	7
August ..	30.29	29.40	29.991	96.3	53.2	71.6	73.0	S.	6.35	0	16	8
Sept'rber .	30.61	29.57	30.077	84.2	40.8	62.9	78.0	N. E.	7.40	0	15	14
October ...	30.43	29.49	29.980	68.7	34.9	49.2	72.4	W.	4.14	0	15	11
Nov'ber .	30.79	29.26	30.033	72.3	18.0	45.2	75.4	S.	4.81	1	12	11
Dec'ber ..	30.61	29.13	30.049	56.3	8.8	34.4	74.4	S. W.	4.05	6	8	8
1889.												
Jan'y	30.63	29.15	30.033	58.0	17.4	36.2	76.8	W., S. W.	5.38	2	11	12
Feb'y.	30.86	29.26	30.158	50.0	2.0	26.6	76.0	W.	3.07	7	12	10
March	30.58	29.22	29.908	62.0	25.0	39.9	70.2	W.	4.09	6	11	15
April	30.48	29.23	29.984	80.0	34.0	50.0	70.3	N. E.	5.90	0	11	12
May	30.36	29.64	29.976	87.0	40.0	60.0	76.0	E.	3.25	0	11	8
June	30.46	29.61	30.034	88.0	53.0	68.8	77.9	S. E.	2.38	0	8	7
For Year.	30.860	291.30	30.018	96.3	2.0	51.3	74.2	W.	52.09	22	139	118

*Including melted snow.

OF THE SEASONS.

Temperature.
 Spring, 50.6°
 Summer, 70.3°
 Autumn, 52.4°
 Winter, 32.4°

Precipitation.
 4.41 inches
 3.33 "
 5.45 "
 4.17 "

REPORT ON VITAL STATISTICS.

STATION, BEVERLY, N. J.

Latitude, 44° 4' N ; Longitude, 74° 55' W. Height of Barometer Cistern above Sea Level, 40.0 feet.

OBSERVER—C. F. RICHARDSON, State Weather Service.

YEARS.	BAROMETER. (Aneroid)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches)*	Snow (days of)	Days when Precipitation equalled to.	Cloudy Days
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1899.												
July ...	30.49	29.94	30.29	93.0	58.5	71.7	75.7	N. W.	4.61	...	11	-
August	30.52	29.76	30.28	94.0	48.5	72.9	78.4	S. W.	6.14	....	11	8
Sept'ber.	30.64	29.78	30.24	84.0	39.0	63.9	81.	N. W.	4.10	....	11	14
October	30.45	29.71	30.07	67.5	30.5	49.7	78.4	N. W.	4.00	...	13	12
Nov'ber.	30.62	29.45	30.18	75.0	17.0	46.8	79.2	N. W.	4.15	...	11	17
December	30.56	29.06	30.07	60.0	11.0	34.6	75.8	N. W.	3.02	.	8	10
1900.												
January	30.54	29.35	30.00	50.0	17.0	36.6	78.7	N. W.	4.56	.	10	10
February	30.70	29.00	30.11	50.0	1.5	27.4	76.7	N. W.	2.17	....	11	12
March	30.40	29.46	29.93	67.0	25.0	40.5	72.0	N. W.	3.63	....	10	14
April ...	30.59	29.81	30.18	62.0	30.0	52.3	71.8	N.	4.82	..	14	12
May	30.50	30.00	30.24	62.5	35.5	62.4	75.8	N. W.	5.14	..	14	9
June	30.65	29.03	30.32	91.0	48.0	69.6	78.8	S	2.88	.	11	8
For Year.	30.70	29.00	30.70	94.0	1.5	52.2	76.9	N. W.	49.24	..	137	124

*Including melted snow.

OF THE SEASONS.

Temperature.
Spring, 51.7°
Summer, 71.4°
Autumn, 53.6°
Winter, 32.5°

Precipitation,
4.58
4.56
4.09
3.24

STATION, NEW BRUNSWICK, MIDDLESEX COUNTY, N. J.

Latitude, 49°29' N.; Longitude, 74°10' W. Height of Barometer Cistern above Sea Level, 90 feet.

OBSERVER—E. W. McGANN, Signal Corps.

YEARS.	BAROMETER. (Reduced to 32° and Sea Level.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equalled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1888.												
July.....	30.274	29.597	30.030	90.8	51.0	69.9	87.8	.....	3.08	.....	9	6
August...	30.310	29.470	30.010	93.2	49.0	71.5	86.9	.....	5.58	.....	11	8
Sept.	30.615	29.601	30.080	81.8	36.0	62.0	90.7	.....	8.66	.....	15	14
October..	30.436	29.477	29.995	67.8	28.8	47.8	88.4	.....	5.58	.....	13	10
Nov.	30.811	29.255	30.135	.....	.....	44.1	91.3	.....	4.37	.....	13	11
December	30.644	28.980	30.071	56.7	7.0	33.8	86.8	.....	3.97	.....	8	7
1889.												
January..	30.505	29.167	30.059	58.9	14.8	36.1	89.3	.....	6.42	.....	12	9
February	30.878	29.460	30.157	50.0	0.5	26.8	85.7	.....	2.41	.....	9	12
March....	30.540	29.291	29.938	62.0	24.0	40.1	88.0	.....	3.35	.....	10	11
April.....	30.497	29.252	30.000	76.8	31.0	50.7	84.2	.....	5.01	.....	14	14
May.....	30.384	29.657	30.000	88.0	36.0	61.5	89.3	.....	3.48	.....	14	9
June	30.469	29.662	30.050	88.0	46.0	69.8	89.8	.....	3.85	.....	9	14
For the yr	30.878	28.980	30.043	93.2	0.5	51.2	88.2	.....	55.76	.....	137	125

*Including melted snow.

OF THE SEASONS.

Temperature.

Spring, 50.5°

Summer, 70.4°

Autumn, 51.3°

Winter, 32.2°

Precipitation.

3.95 inches.

4.17 "

6.20 "

4.27 "

REPORT ON VITAL STATISTICS.

STATION, CAPE MAY COURT HOUSE, N. J.

Latitude, 38° 56' N.; Longitude, 74 58' W. Height of Barometer Cistern above Sea Level, — feet.

OBSERVER—J. F. LEAMING, M. D., State Weather Service.

YEARS.	BAROMETER. (Reduced to 32 degrees.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).	Snow (days of).	Days when Precipitation equalled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1895.												
July		81.5	54.5	71.1		..	..			..
August				83.0	48.0	78.8		..	..			..
Sept.				82.0	42.0	65.1		..	..			..
October.				70.0	32.0	51.6		..	..			..
Nov				72.0	27.0	48.6		..	..			..
December				63.0	15.0	40.4		..	..			..
1896.												
January				58.5	21.0	40.8		..	..			..
February				50.5	5.0	31.4		..	..			..
March.		64.0	28.5	42.4		..	..			..
April				76.5	32.0	51.9		..	..			..
May .				80.8	37.0	62.1		..	..			..
June				87.0	50.0	74.8		..	..			..
For the yr				93.0	5.0	54.4		..	..			..

OF THE SEASONS.

Temperature
Spring, 52.1°
Summer, 73.0°
Autumn, 55.1°
Winter, 37.5°

Precipitation
— inches.
— "
— "
— "

STATION, PHILADELPHIA.

Latitude, 39° 57'; Longitude, 75° 9'. Height of Barometer Cistern above sea Sea Level, 117 feet.

OBSERVER—L. M. DEY, Signal Corps.

YEAR.	BAROMETER. (Reduced to sea level.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches)*	Snow (days of.)	Days when Precipitation equalled 0.01.	Cloudy days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1888.												
July	30.26	29.66	30.032	93.8	56.8	72.1	66.4	S. W., N. W.	3.38	....	10	11
August ..	30.30	29.42	30.011	97.8	54.0	73.0	66.6	S. W.	5.86	....	12	8
Sept	30.56	29.64	30.079	81.6	40.5	63.6	79.0	N. E., N. W.	5.73	...	13	16
October ..	30.41	29.44	29.997	69.5	34.8	50.4	71.8	N. W.	3.23	....	15	12
Nov.....	30.76	29.33	30.153	75.0	18.0	45.8	76.4	N. W.	3.77	....	14	20
Dec'r	30.64	29.03	30.092	61.0	12.0	35.8	63.8	N. W.	2.15	....	8	10
1889.												
Jan	30.63	29.19	30.070	59.0	18.0	37.3	72.2	W., N. W.	3.75	....	11	11
Feb'y	30.86	29.45	30.180	51.0	2.0	28.2	68.6	N. W.	2.00	....	10	13
March ...	30.53	29.36	29.941	66.0	25.0	41.1	67.4	N. W.	2.53	....	12	15
April	30.49	29.27	29.984	78.0	34.0	51.6	68.2	N. E.	3.17	....	14	16
May	30.38	29.65	29.942	90.0	43.0	63.0	71.4	N. W.	4.32	....	15	12
June.	30.46	29.68	30.050	88.0	54.0	69.8	74.0	S. W.	3.39	....	13	15
For Year	30.860	29.030	30.048	97.0	2.0	52.6	70.9	N. W.	43.33	....	147	159

*Including melted snow.

OF THE SEASONS.

Temperature.	Precipitation.
Spring, 51.9°	3.36 inches
Summer, 71.6°	4.21 "
Autumn, 53.8°	4.24 "
Winter, 33.8°	2.43 "

METEOROLOGICAL SUMMARY FOR THE STATE.

July, 1888.

TEMPERATURE.—The mean temperature for July, 1888, 71.1 degrees, is only three-tenths of a degree higher than the mean for June, and is 3.4 degrees below the average determined from past records of forty-eight stations. The highest temperatures (above 90 degrees) were recorded on the 5th, 7th, 23d and 24th, and the lowest (below 50 degrees) on the 2d, 14th, 18th and 19th.

PRECIPITATION.—The average rainfall for the State, 3.40 inches, is 0.82 inches below the July average, and was unevenly distributed. The largest total for the month, 7.08 inches, is reported from Burlington county, and the least, 1.25 inches, from Morris county. One station reports a total slightly above seven inches, one over six, two over five, three over four, seven over three, nine over two, and one reports a total of less than two inches. The largest total in 24 hours, 3.78 inches, occurred at Oceanic on the 19th, and at Moorestown, 3.13 inches, on the 19th, and 20th. The most destructive thunder storm of the month occurred on the 5th, when the Pennsylvania Railroad round house near this city was blown down, burying three men in the debris, all of whom were seriously injured. A barn near Middlebush was also blown down, killing one man, who was buried with two others under the ruins. Three horses were killed by the fall of the barn, and the dwelling and other buildings were wrecked. Serious damage occurred in other portions of Middlesex county from wind, hail and lightning, especially at Middlebush and Milltown. At Asbury Park the new Roman Catholic Church was blown down. The edifice was enclosed and ready for plastering. The destruction to crops was serious and widespread; whole fields of grain were destroyed.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.02; maximum observed, 30.274, on the 17th; minimum observed, 29.597, on the 11th; range for State, 0.677.

TEMPERATURE—(degrees F.)—Monthly mean, 71.3; highest monthly mean, 76.0, at Trenton; lowest monthly mean, 67.7, at Hanover; maximum, 99.0, at Lambertville, on 23d, minimum, 45.0, at Hanover and Tenaflly on 14th and 18th respectively; range for State, 54.0; greatest local monthly range, 50.0, at Tenaflly; least local monthly range, 32.0, at Ocean City; greatest daily range, 42.0, at Tenaflly, on the 3d and 25th; least daily range, 2.0, at Oceanic, on the 9th.

PRECIPITATION.—including melted snow (in inches.)—Average for the State, 3.50; greatest, 7.08, at Moorestown; least, 1.25, at Gillette. **Wind**—Prevailing direction, northwest and southwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—1, 3, 4, 5, 7, 9, 21, 23, 19, 20, 22, 24, 27, 30, 31.—*Hail*—5th. *Solar Halos*—7th. *Lunar Halos*—18 h. *Meteors*—22. *Polar Bands*—11. *Auroras*—0.

August, 1888.

TEMPERATURE.—The mean temperature for August, 1888, 72.5 degrees, is 0.5 degrees above the average determined from past records of fifty stations. The highest temperature (above 90 degrees) were recorded at all stations except one, on 4th, 5th, 7th, 8th and 16th, and the lowest, (below 50 degrees) at fifteen

stations, on the 18th, 22d, 23d, 28th, 29th, 30th and 31st. The maximum for the month, 98.0, was recorded at Tenaflly and Oceanic on the 16th, and the minimum, 41.0 at Hanover on the 29th.

PRECIPITATION—The average rainfall for the State, 6.13 inches, is 1.89 inches above the average determined from past records of fifty stations. The largest amount reported was 10.53 inches, at Plainfield, Union County, and the smallest, 2.55 inches, at Egg Harbor City, Atlantic County. Twenty-five stations report an excess and five stations a deficiency.

ATMOSPHERIC PRESSURE (in inches.)—Monthly mean, 30.00; maximum observed, 30.81, at Highland Park, on the 11th; minimum, 29.40, New York City, on the 21st; range for State, 0.91.

TEMPERATURE (degrees F.)—Monthly mean, 72.5; highest monthly mean, 77.0, at Trenton; lowest monthly mean, 68.6, at Hanover; maximum, 98.0, at Oceanic and Tenaflly, on 16th; minimum, 41.0, at Hanover, on the 29th; range for State, 57.0; greatest local monthly range, 53.0, at Tenaflly; least local monthly range, 29.0, at Ocean City; greatest daily range, 40.5, at Freehold, on the 30th; least daily range, 2.0, at Lambertville, on the 12th.

PRECIPITATION—including melted snow (in inches.)—Average for the State, 6.13; greatest, 10.53, at Plainfield; least, 2.55, at Egg Harbor City.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—1, 3, 4, 5, 6, 7, 8, 12, 15, 16, 17, 18, 20, 21, 23, 26, 27. *Hail*—27, at Union, Union County. *Solar Halos*—11, 16. *Lunar Halos*—10, 14, 15, 16, 20, 22, 23, 26. *Meteors*—10, 22, 25, 29. The readings of the barometer, corrected to sea-level, at Highland Park station, were as follows: August 20th—7 A. M., 30.04; 2 P. M., 30.01; 9 P. M., 30.03. August 21st—7 A. M., 29.88; 2 P. M., 29.80; 9 P. M., 29.47. The total rainfall at this station was 2.90 inches; at New York City, 8.92 inches; at Philadelphia, 2.08 inches and at Plainfield, 5.75 inches.

September, 1888.

TEMPERATURE.—The mean temperature for September, 1888, 63.1 degrees, is 2.2 below the average determined from past records of fifty-two stations. The maximum for the month, 96.0 degrees, was recorded at Toms River on the 22d, and the minimum, 30.0 degrees at Tenaflly on the 30th. Range for the State, 66.0 degrees.

PRECIPITATION.—The average rainfall for the State, 7.09 inches, is 3.20 inches above the average determined from past records of forty-nine stations. The largest amount reported was 10.65 inches at Oceanic and the smallest 3.75 inches at Bridgeton. The average number of days upon which rain fell was 12.1.

ATMOSPHERIC PRESSURE—(in inches.)—Monthly mean, 30.076; maximum observed, 30.615, at Highland Park, on the 7th; minimum observed, 29.570, at New York City, on the 26th; range for State, 1.045.

TEMPERATURE (degrees F.)—Monthly mean, 63.1; highest monthly mean, 68.0, at Trenton; lowest monthly mean, 59.3, at Tenaflly; maximum, 96.0, at Toms River on the 22d; minimum, 30.0, at Tenaflly, on the 30th; range for State, 66.0; greatest local monthly range, 61.0, at Toms River; least local monthly range, 33.0, at Ocean City; greatest daily range, 38.5, at Freehold, on the 8th; least daily range, .00, at Ocean City, on the 6th.

PRECIPITATION—including melted snow (in inches.)—Average for the State,

7.09, greatest, 10.65, at Oceanic; least, 3.75, at Bridgeton. *Wind*—Prevailing direction, northeast.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—8, 9, 10, 12, 13, 16, 19, 20, 21, 29. *Hail*—12th, at Madison; 29th at Locktown, 30th, at South Orange. *Snow*—At Trenton, 29th and 30th. Very light at Paterson, on 7th. *Frost*—29th and 30th. *Solar Halos*—6, 10, 15. *Lunar Halos*—15, 18, 19, 20, 24, 25. *Parhelion*—Beverly 20.

October, 1888.

TEMPERATURE.—The mean temperature for October, 1888, 49.2 degrees, is 5.2 below the average determined from past records of fifty stations. The warmest days of the month were the 1st, 2d, 5th and 6th, and the coldest the 4th, 10th, 11th, 22d, 30th and 31st.

PRECIPITATION.—The average rainfall for the State, 4.78 inches, is 1.34 inches above the average determined from past records of forty-eight stations. The average number of days upon which rain fell, 11.6.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 29.995; maximum observed, 30.436, at Highland Park, on the 31st; minimum observed, 29.477, at Highland Park, on the 1st, range for State, 0.959.

TEMPERATURE (degrees F) —Monthly mean, 49.2; highest monthly mean, 54.3, at Ocean City, lowest monthly mean, 44.0, at Hanover; maximum, 76.0 at Clayton, on 1st, minimum, 25.0, at Hanover, on the 10th, 11th, 31st; range for state, 51.0; greatest local monthly range, 44.0, at Clayton; least local monthly range, 30.0, at Billingsport; greatest daily range, 34.4, at Egg Harbor City, on the 21st, least daily range, 0.5, on the 24th, at Egg Harbor City.

PRECIPITATION—including melted snow (in inches).—Average for the State, 4.73, greatest, 7.00, at Ocean City, least, 2.97, at Freehold. *Wind*—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—6, 7, 11, 16, 17. *Hail*—13, 17. *Frost*—2, 3, 4, 9, 10, 11, 15, 18, 19, 20, 21, 22, 25, 26, 27, 30, 31. *Solar Halos*—5, 18, 25, 26. *Lunar Halos*—14, 15, 16, 18, 25, 26. *Meteors*—4, 7, 28, 31. *Auroras*—30th, Moorestown, Madison, Beverly and South Orange. *Polar Bands*—2d, at 6 P. M.

November, 1888.

TEMPERATURE —The mean temperature for November, 1888, 45.8 degrees, is 3.7 degrees above the average determined from past records of fifty stations. The warmest days during the month were the 1st, 2d, 3d, 4th and 6th, and the coldest, the 21st, 22d and 23d. The lowest temperature recorded in the northern portion of the State was 8.0 degrees; in the central portion 7.0 degrees, and in the southern portion, 27.0 degrees.

PRECIPITATION —The average precipitation for the state, 3.97 inches, is 0.55 inches above the average determined from past records of forty-eight stations.

ATMOSPHERIC PRESSURE (in inches) —Monthly mean, 30.135; maximum observed 30.811, at Highland Park, on the 18th; minimum observed, 29.200, at Atlantic City, on the 26th, range for state, 1.611.

TEMPERATURE (degrees F) —Monthly mean, 45.8; highest monthly mean, 49.2, at Bridgeton; lowest monthly mean, 40.8, at Hanover; maximum 77.0, at

Gillette, Tenafly and Imlaystown, on the 2d and 6th; minimum, 8.0, at Hanover, on the 23d; range for state, 69.0, greatest local monthly range, 67.0, at Tenafly, least local monthly range, 48.0, at Atlantic City, greatest daily range, 38.0, at Tenafly, on the 13th, least daily range, 1.0, at Newark, on the 25th. Mean humidity, 83.3.

PRECIPITATION—(including melted snow in inches).—Average for the state, 3.07; greatest, 5.41, at Trenton, least, 2.86, at Paterson. Average number of days on which precipitation equaled 0.01 inch, 10.5. Average number of days on which cloudiness was 8 or more on a scale of ten, 13. Wind—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—9, 10, 19 Tenafly, Newark and Toms River. *Sleet*—25. *Snow*—23, 24, 25, 26. (No snow on the ground on 15th or last days of month). *Frost*—Frosts were numerous during the month, between the 18th and 23d, ice being formed half an inch thick. *Solar Halos*—4, 10, 14. *Lunar Halos*—10, 14, 15, 17, 24. *Meteors*—1, 2, 3, 4, 6, 31, 22, 27. *Polar Bands*—17th.

December, 1888

TEMPERATURE.—The mean temperature for December, 1888, 34.9 degrees, is 1.2 degrees above the mean for the corresponding month of 1887 and 2.4 degrees above the average determined from past records of 48 stations. The warmest days during the month were the 5th, 17th, 25th, 26th and 27th, and the coldest, the 21st, 22d and 23d. The lowest temperature recorded in the northern portion of the State was 5.0 degrees, in the central, 7.0 degrees, and in the southern portion, 15.0 degrees.

PRECIPITATION.—The average precipitation for the State, 3.69 inches, is 1.60 inches below the average for the corresponding month in 1887, and 0.07 inches above the average determined from past records of forty-eight stations.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.071, maximum observed, 30.644, at Highland Park, on the 30th, minimum observed, 29.980, at Highland Park, on the 17th, range for state, 1.664.

TEMPERATURE (degrees F.)—Monthly mean, 34.9, highest monthly mean, 40.4, at Cape May C. H., lowest monthly mean, 31.6, at Hanover, maximum, 46.0, at Trenton, 17th, minimum, 5.0, at Hanover, on the 22d, range for State, 61.0, greatest local monthly range, 56.0, at Trenton and Tenafly, least local monthly range, 38.0, at Ocean City, greatest daily range, 40.0, at Tenafly, on the 5th; least daily range, 0.2, at Egg Harbor City, on the 18th.

PRECIPITATION—(including melted snow in inches).—Average for the State, 3.69, greatest, 4.95, at South Orange, least, 2.05, at Clayton. Average number of days on which precipitation equaled 0.01 inch, 7.6. Average number of days on which cloudiness was 8 or more on a scale of ten, 7.8. Wind—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—27th, at Imlaystown and Trenton. *Snow*—1, 4, 13, 20, 21, 28, 29. (No snow on the ground on the 15th or last day of the month). *Solar Halos*—6, 8, 13, 14, 26. *Lunar Halos*—8, 10, 11, 12, 15, 16, 17, 22, 26. *Meteors*—2, 14, 28, 30. *Auroras*—1, 26, at Clayton and Egg Harbor City. *Polar Bands*—30th, at Beverly.

January, 1889.

TEMPERATURE.—The mean temperature for January, 1889, 36.3 degrees, is 6.7 degrees above the average determined from past records of 49 stations and 10.8 degrees above the average for the corresponding month of 1888. The warmest days during the month were the 4th, 5th, 8th, 9th, 16th and 17th, and the coldest, the 2d, 15th, 19th, 20th, 22d, 23d, 24th and 30th. The lowest temperature recorded in the northern portion of the State was 8.0 degrees; in the central portion 16.0 degrees, and in the southern portion, 21.0 degrees.

PRECIPITATION.—The average precipitation for the State, 5.68 inches, is 2.04 inches above the average determined from past records of forty-nine stations, and 0.91 inches above the average for the corresponding month of 1888. Three stations, Freehold, Oceanic and Plainfield, report a total for the month exceeding eight inches, two stations, Toms River and South Orange, a total exceeding seven inches, and nine stations a total exceeding six inches. The snow-fall during the month was phenomenally light; the greatest depth reported was six inches at Madison on the 20th. This station is the only one reporting snow on the ground at the close of the month (about one inch).

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.060; maximum, observed, 30.630, at New York City and Philadelphia, on the 23d; minimum, observed, 29.150, at New York City, on the 27th; range for the State, 1.480.

TEMPERATURE (degree F.)—Monthly mean, 36.3; highest monthly mean, 40.8 at Cape May C. H.; lowest monthly mean, 32.8, at Tenaflly; maximum, 67.0, at Tenaflly, on the 5th; minimum, 8.0, at Tenaflly, on the 23d; range for State, 58.0, greatest local monthly range, 59.0 at Tenaflly; least local monthly range, 33.0, at Ocean City; greatest daily range, 33.0, at Tenaflly, on the 5th, least daily range, 0.0, at Moorestown and Readington on the 5th, 3d and 7th respectively. Mean humidity, 83.4.

PRECIPITATION—(including melted snow in inches).—Average for the State, 5.68; greatest, 8.78, at Oceanic; least, 3.84, at Hopewell. *Wind*—Prevailing direction, northwest and west.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—January, 9, at Beverly. *Hail*—9, at Beverly. *Sleet*—20. *Snow*—20, 21, 28, 29. *Solar Halos*—4, 11, 21, 24, 26, 29, 31. *Lunar Halos*—9, 11, 15, 17, 19, 20, 21, 23, 24, 25. *Meteors*—25. *Polar Bands*—7, 9, at Beverly.

February, 1889.

TEMPERATURE (degrees F.)—The mean temperature for February, 1889, 27.7 degrees, is 3.8 degrees below the average determined from past records of 50 stations, and 2.09 degrees below the average for the corresponding month of 1888. The warmest days during the month were the 5th, 9th, 15th, 17th, 18th and 19th, and the coldest the 4th, 23d and 24th. The lowest temperature recorded in the northern portion of the State was zero; in the central 3.0 degrees below zero, and in the southern 5.0 degrees above zero. The mean temperature of the winter season just closed 32.9, is 2.6 degrees above the mean of the winters of 1887 and 1888, and 1.7 degrees above the winter normal.

PRECIPITATION.—The average precipitation for the State, 2.49 inches, is 0.97 inches below the average determined from past records of forty-eight stations, and 1.04 inches below the average for the corresponding month of 1888.

ATMOSPHERIC PRESSURE (in inches) —Monthly mean, 30.169, maximum observed, 30.876, at Highland Park, on the 24th, minimum observed, 29.360, at New York City, on the 5th, range for the State, 1.616.

TEMPERATURE (degrees F) —Monthly mean, 27.7, highest monthly mean, 32.9, at Bridgeton; lowest monthly mean, 25.1, at Madison; maximum, 57.0, at Plainfield, on the 19th; minimum, 3.0, at Locktown, on the 24th, range for State, 60.0, greatest local monthly range, 58.0, at Plainfield; least local monthly range, 42.0, at Billingsport and New Brunswick; greatest daily range, 34.0, at Allaire, on the 5th, least daily range, 0.0, at Union, on the 18th. Mean humidity 77.2

PRECIPITATION—(including melted snow in inches) —Average for the State, 2.49, greatest, 3.80, at Ocean City, least, 1.65, at Hopewell. Average number of days on which precipitation equaled 0.01 inch, 8.4. Average number of days on which cloudiness was 8 or more in a scale of 10, 9.3. *Wind*—Prevailing direction, northwest and west.

MISCELLANEOUS PHENOMENA—dates observed —*Sleet*—17, Locktown. *Snow*—1, 3, 4, 5, 6, 8, 10, 11, 12, 13, 22, 24, 25, 27, 28. *Solar Halos*—4, 8, 11, 13, 15, 21, 24, 26. *Lunar Halos*—13, 17, 26. *Meteors*—7, 14. *Auroras*—1, 3, Egg Harbor City. *Corona*—17, at Moorestown, quite brilliant at 9 P. M.

March, 1889

TEMPERATURE (degrees F) —The mean temperature for March, 1889, 40.5 degrees, is 3.7 degrees above the average determined from past records of 49 stations, and is 7.7 degrees above the average for the corresponding month of 1888. The warmest days during the month were the 13th, 23d and 24th, and the coldest the 1st, 10th, 11th, 12th, 25th, 26th, 29th, 30th and 31st. The lowest temperature recorded in the northern portion of the State was 19.0 degrees, in the central 22.0 degrees, and in the southern 28.5 degrees.

PRECIPITATION —The average precipitation for the State, 3.79 inches, is 0.20 inches below the average determined from past records of forty nine stations, and is 1.92 inches below the average for the corresponding month of 1888. One station, Bridgeton, reports a total for the month exceeding six inches; five stations, Egg Harbor City, Freehold, Oceanic, Toms River and Trenton, report a total exceeding five inches, and four stations, Atlantic City, Imlaystown, Ocean City and New York, a total exceeding four inches.

ATMOSPHERIC PRESSURE (in inches) —Monthly mean, 29.947, maximum observed, 30.53, at New York and Philadelphia, on the 1st; minimum observed, 29.22, at New York City, on the 7th; range for the State, 1.31.

TEMPERATURE (degrees F) —Monthly mean, 40.5, highest monthly mean, 44.4, at Hanover, lowest monthly mean, 38.5, at Tenafly, maximum, 70.0, at Tenafly, on the 23d and 24th, minimum, 19.0, at Tenafly and Paterson on the 29th and 30th respectively; range for State, 51.0; greatest local monthly range, 51.0, at Tenafly, least local monthly range 22.0, at Ocean City; greatest daily range, 44.0 at Tenafly on the 13th, least daily range, 1.0, at Imlaystown, Moorestown, Ocean City and Oceanic on the 21st. Mean humidity, 75.2.

PRECIPITATION—(including melted snow in inches) —Average for the State, 3.79, greatest, 6.49, at Bridgeton; least, 1.98, at Princeton. Average number of days on which precipitation equaled 0.01 inch, 8. Average number of days

on which cloudiness was 8 or more on a scale of 10, 12.8. *Wind*—Prevailing direction, northeast and northwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—15th, at Bridgeton; 26th, Tenafly; 27th, at Beverly, Oceanic, New York, Madison, Rancocas, Somerville, South Orange, Plainfield, Highland Park and Gillette. *Hail*—15, 28, 31. *Sleet*—31. *Snow*—7, 8, 9, 10, 20, 21, 28, 30, 31, generally melting as it fell. *Solar Halos*—1, 2, 6, 14, 23. *Lunar Halos*—9, 10, 13, 14, 15.

April, 1889

TEMPERATURE (degrees F.)—The mean temperature for April, 1889, 51.9 degrees, is 3.8 degrees above the average for the month, and also for the corresponding month of 1888. The warmest days were the 19th, 20th, 21st, and the coldest, the 1st, 5th, 6th, 7th, 8th, 18th, 14th and 23d. The lowest temperature recorded in the northern portion of the State was 25.0 degrees, in the central portion, 25.0, and in the southern portion, 32.0 degrees.

PRECIPITATION.—The average precipitation for the State, 5.32 inches, is 1.65 inches above the average for the month and is 2.04 inches above the average for the corresponding month of 1888. Three stations, Hanover, Plainfield and South Orange, report a total for the month exceeding seven inches; five stations, Freehold, Madison, Newark, Tenafly and Union, a total exceeding six inches, and nine stations, Gillette, Highland Park, Hopewell, Locktown, New York, Ocean City, Oceanic, Somerville and Trenton, a total exceeding five inches.

ATMOSPHERIC PRESSURE (in inches.)—Monthly mean, 29.980; maximum observed, 30.50, at Atlantic City, on the 23d; minimum observed, 29.23, at New York City, on the 27th; range for State, 1.27.

TEMPERATURE (degrees F.)—Monthly mean, 51.2, highest monthly mean, 55.2, at Bridgeton; lowest monthly mean, 48.0, at Atlantic City; maximum, 83.0, at Tenafly, on the 21st; minimum, 25.0, at Allaire and Tenafly, on the 6th and 23d; range for State, 58.0; greatest local monthly range, 58.0, at Tenafly; least local monthly range, 37.0, at Ocean City; greatest daily range, 48.0, at Beverly, on the 11th; least daily range, 1.0, at Bridgeton and Trenton, on the 25th and 26th respectively. Mean humidity, 77.0.

PRECIPITATION—(including melted snow in inches).—Average for the State, 5.32; greatest, 7.25, at Plainfield; least, 2.92, at Atlantic City. Average number of days on which precipitation equaled 0.01 inch, 11.5. Average number of days on which cloudiness was 8 or more on a scale of 10, 13.7. *Wind*—Prevailing direction, northeast.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*, 1, 2, 3, *12, 19, *20, 22, 28. *Hail*—20th, at Madison, Freehold and Ocean City. *Frost*—5, 6, 7, 9, 11, 14, 15, 16, 22, 23, 24. *Solar Halos*—11, 15, 25. *Lunar Halos*—15, 16. *Auroras*—Madison, on 7th, at 9 p. m.

*Quite general throughout the State.

May, 1889.

TEMPERATURE (degrees F.)—The mean temperature for May, 1889, 63.3 degrees, is 2.6 degrees above the average for the month, and 9.9 degrees above the average for the corresponding month of 1888. The warm periods were from the 5th to 11th, and 16th to 18th, inclusive. The highest temperature during

the month was recorded at all stations on the 10th, and ranged from 87 to 94 degrees. The first four days of the month were the coolest; several stations reporting light, harmful frosts on these dates.

PRECIPITATION.—The average precipitation for the State, 4.09 inches, is 0.35 inches above the average for the month and is 0.83 inches below the average for the corresponding month of 1888. Very little rain fell during the first nineteen days, during which time the growing crops were in a most flourishing condition in all parts of the State. The last twelve days were unusually wet and very unfavorable for farming operations. Beans, corn, tomatoes and melons have been greatly retarded, while the fruit crops, especially cherries, strawberries and apples, are reduced to one-half of the average yield. The high winds during the month caused considerable damage. The observer at "Cranmoor Farm," Tom's River, reports as follows: "On the 10th at 6 P. M. a heavy gale from the northwest, doing considerable injury to trees. Several cottages, one barn, and the freight house at Island Heights were prostrated. The storm was followed by severe thunder and lightning, (zig-zag,) killing one person and stunning several.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 29.983; maximum observed, 30.384, at Highland Park, on the 18th; minimum observed, 29.657, at Highland Park, on the 11th; range for State, 0.727.

TEMPERATURE (degrees F.).—Monthly mean, 62.8; highest monthly mean, 67.0, at Trenton; lowest monthly mean, 58.0, at Atlantic City; maximum, 94.0, at Tenaflly, on the 10th; minimum, 32.0, at Allaire, on 2d; range for State, 62.0; greatest local monthly range, 59.0, at Tenaflly; least local monthly range, 40.0, at Readington; greatest daily range, 46.0, at Plainfield and Tenaflly on the 5th and 9th, respectively; least daily range, 1.0, at Billingsport, Moorestown and Oceanic, on the 27th. Mean humidity, 79.3.

PRECIPITATION—(including melted snow in inches).—Average for the State, 4.09; greatest, 6.60, at Bridgeton; least, 2.43 at Newark. Average number of days on which precipitation equaled 0.01 inch, 11.6 average; number of days on which cloudiness was 8 or more on a scale of 10, 10.8. *Wind*—Prevailing direction, northwest and southwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—10, 13, 14, 15, 20, 21. *Frost*—1, 2, 3, 4. *Solar Halos*—1, 14, 15, 25. *Lunar Halos*—5, 7, 15. *Auroras*—Beverly, 28, 29. *Polar Bands*—Beverly, 29.

June, 1889.

TEMPERATURE (degrees F.).—The mean temperature for June, 1889, 69.9 degrees, is 1.6 degrees above the average for the month, and 0.9 degrees below the average for the corresponding month of 1888. The highest temperature recorded was 92.0 degrees and the lowest 37.0 degrees, as against 94.0 degrees and 32.0 degrees respectively during June, 1888. The month was particularly noted for its excessive moisture, the mean humidity being 83.3 per cent.

PRECIPITATION.—The average precipitation for the State, 3.73 inches, is 0.25 inches below the average for the month, and is 1.14 inches above the average for the corresponding month of 1888. The rainfall was very unevenly distributed. Lambertville, Hunterdon county, reports a total of 6.75 inches, and Locktown, Hunterdon county, 5.92 inches, (these stations are situated near the

western central edge of the State); Oceanic, Monmouth county, 5.99 inches, and Hopewell, Mercer county, 5.05 inches. Three stations report a total exceeding four inches, sixteen a total exceeding three inches, and eight exceeding a total of two inches.

During the month there were nine days on which thunder storms occurred, as against sixteen during June, 1888.

ATMOSPHERIC PRESSURE (in inches)—Monthly mean, 30.050, maximum observed, 30.489, at Highland Park, on the 24th; minimum observed, 29.662, at Highland Park, on the 5th, range for State, 0.807.

TEMPERATURE (degrees F.)—Monthly mean, 69.9; highest monthly mean, 74.9, at Readington, lowest monthly mean, 56.0, at Atlantic City, maximum, 92.0, at Billingsport on the 17th and 21st; minimum, 37.0, at Freehold, on the 4th; range for State, 55.0, greatest local monthly range, 51.0, at Freehold and Gillette; least local monthly range 30.0, at Bridgeton and Readington; greatest daily range 41.0 at Tenafly on the 7th; least daily range, 2.0, at Newark, Paterson and New Brunswick, on 1st and 12th, mean humidity, 83.3.

PRECIPITATION (in inches)—Average for the State 3.73; greatest, 6.75, at Lambertville, least 2.39, at Tenafly. Average number of days on which precipitation equaled 0.01 inch, 9.7. Number of days on which cloudiness was 8 or more on a scale of 10, 10. Wind—Prevailing direction, southwest.

MISCELLANEOUS PHENOMENA—dates observed—*Thunder Storm*—4, 5, 9, 10, 11, 12, 14, 15, 16, 17, 21, 26. *Hail*—5, Union; 17, Egg Harbor City. *Solar Halos*—1, 4, 5, 11, 13, 17, 18, 24, 25. *Lunar Halos*—2, 4, 5, 7, 8, 9, 11. *Meteors*—5th (Beverly), 26th (Rancocas), quite brilliant.

Number of Marriages, Births and Deaths By Townships and Counties, and Totals for the State.

FOR THE YEAR ENDING JUNE 30, 1889.

ATLANTIC COUNTY.

	M.	B.	D.
Absecon	5	12	8
Atlantic City	170	222	267
Buena Vista	4	20	16
Egg Harbor City.....	20	47	27
Egg Harbor Township.....	27	61	69
Galloway	10	41	33
Hamilton	20	19	26
Hammonton.....	23	86	62
Mullica	4	6	18
Weymouth.....	0	12	12
	283	526	533

BERGEN COUNTY.

	M.	B.	D.
Bolling Spring	0	3	4
Englewood	37	50	76
Franklin.....	22	48	31
Harrington	7	39	39
Hohokus	9	47	37
Lodi	28	101	67
Midland.....	13	22	30
New Barbadoes	43	122	91
Orvil.....	15	14	10
Palsade.....	20	29	21
Ridgefield	25	78	60
Ridgewood.....	4	22	28
Saddle River.....	1	46	22
Union.....	19	61	77
Washington	15	45	41
	258	727	634

REPORT ON VITAL STATISTICS.

BURLINGTON COUNTY.

	M.	B.	D.
Bass River.	5	20	17
Beverly ..	27	34	43
Bordentown ..	46	123	68
Burlington ..	87	110	142
Chester ..	26	71	47
Chesterfield ..	7	16	21
Cinnaminson.	27	91	58
Delvan.	10	42	22
Eastampton ..	4	8	5
Freshman ..	5	28	24
Florence ..	8	62	24
Little Egg Harbor ..	11	33	29
Lamberton.	2	25	10
Mansfield ..	9	46	28
Medford ..	10	10	32
Mount Laurel ..	0	20	17
New Hanover ..	14	27	26
Northampton ..	78	134	70
Pemberton ..	20	18	46
Randolph ..	4	12	8
Shamong ..	0	4	9
Southampton ..	9	25	29
Springfield.	5	27	13
Washington ..	2	12	3
Westampton ..	1	4	5
Willingboro ..	5	10	9
Woodland ..	1	19	4
	47	1,065	642

CAMDEN COUNTY.

	M.	B.	D.
Camden City*	4,432	1,139	1,150
Centre ..	5	42	47
Delaware ..	0	20	7
Gloucester City ..	46	157	141
Gloucester ..	11	66	79
Haddon ..	37	95	63
Stockton ..	42	116	125
Waterford ..	14	60	40
Winslow ..	9	88	30
	4,655	1,733	1,692

*Marriages of non-residents, 3,609.

CAPE MAY COUNTY.

	M.	B.	D.
Cape May City ..	27	50	25
Dennis.	21	33	42
Lower ..	11	45	43
Middle ..	16	33	33
Upper.	22	18	34
	97	219	147

MARRIAGES, BIRTHS AND DEATHS.

419

CUMBERLAND COUNTY.

	M.	B.	D
Bridgeton.....	103	294	165
Commercial.....	18	61	23
Deerfield.....	18	32	28
Downe.....	18	26	20
Fairfield.....	7	45	26
Greenwich.....	3	23	13
Hopewell.....	7	37	35
Landis.....	75	148	134
Lawrence.....	20	34	31
Maurice River.....	13	48	28
Millville.....	95	270	181
Stoe Creek.....	6	25	7
	383	1,043	641

ESSEX COUNTY.

	M.	B.	D
Belleville.....	25	89	77
Bloomfield.....	44	195	104
Caldwell.....	15	44	30
Clinton.....	13	62	38
East Orange.....	103	226	154
Franklin.....	8	23	21
Livingston.....	8	21	19
Millburn.....	9	43	23
Montclair.....	46	159	95
Newark.....	1,593	4,920	4,253
Orange.....	175	469	385
South Orange.....	19	69	62
West Orange.....	16	44	49
	2,074	6,344	5,310

GLOUCESTER COUNTY.

	M.	B.	D.
Clayton.....	20	31	40
Deptford.....	8	37	29
East Deptford.....	0	3	2
East Greenwich.....	9	14	21
Franklin.....	16	52	40
Glassboro.....	27	85	46
Greenwich.....	5	34	20
Harrison.....	8	26	27
Logan.....	10	22	17
Mantua.....	5	30	27
Monroe.....	17	45	42
South Harrison.....	1	20	7
Washington.....	14	20	19
West Deptford.....	7	23	8
Woodbury.....	58	102	38
Woolwich.....	16	70	32
	219	617	415

REPORT ON VITAL STATISTICS.

HUDSON COUNTY.

	M.	B.	D.
Bayonne	52	300	339
Cuttentberg	13	54	40
Harrison	27	264	309
Hoboken	515	1,281	1,102
Jersey City	1,180	3,149	4,068
Kearny	28	120	129
North Bergen	25	58	115
Town of Union	140	182	208
Union	8	46	46
Weehawken	3	31	35
West Hoboken	79	252	304
	2,099	5,643	6,941

HUNTERDON COUNTY.

	M.	B.	D.
Alexandria	4	17	13
Bethlehem	9	22	38
Clinton	13	51	34
Delaware	10	44	30
East Amwell	5	12	13
Franklin	10	20	14
Frenchtown	26	12	15
High Bridge	13	30	21
Holland	13	20	19
Kingwood	4	10	13
Lambertville	54	63	64
Lebanon	20	55	32
Raritan	17	48	45
Readington	21	37	42
Tewksbury	19	48	28
Union	12	13	9
West Amwell	1	9	11
	265	562	487

MERCER COUNTY.

	M.	B.	D.
East Windsor	31	46	34
Ewing	6	7	32
Hamilton	14	24	73
Hopewell	37	57	45
Lawrence	2	16	16
Princeton	33	75	59
*Trenton	625	988	758
Washington	0	16	10
West Middlesex	7	20	16
	756	1,238	1,103

*Marriages of non-residents, 101.

MARRIAGES, BIRTHS AND DEATHS.

413

MIDDLESEX COUNTY.

	M.	B.	D.
Cranbury	14	35	20
East Brunswick	24	80	61
Madison	1	21	17
Monroe	10	32	38
New Brunswick	136	412	386
North Brunswick	13	23	20
Perth Amboy	65	177	186
Piscataway	16	69	51
Raritan	25	55	38
Sayreville	32	53	36
South Amboy	19	70	89
South Brunswick	16	48	48
Woodbridge	12	81	59
	383	1,156	1,049

MONMOUTH COUNTY.

	M.	B.	D.
Atlantic	8	23	20
Eatontown	5	39	38
Freehold	51	87	86
Holmdel	8	15	19
Howell	23	52	38
Long Branch	78	149	72
Manalapan	21	27	29
Marlboro	8	22	28
Matawan	26	56	58
Middletown	36	88	97
Millstone	16	32	21
Neptune	77	131	143
Ocean	14	20	36
Raritan	28	107	87
Shrewsbury	84	108	100
Upper Freehold	29	65	49
Wall	52	75	69
	564	1,096	985

MORRIS COUNTY.

	M.	B.	D.
Boonton	19	33	48
Chatham	31	91	65
Chester	10	39	36
Hanover	15	54	135
Jefferson	7	12	18
Mendham	14	20	28
Montville	9	6	20
Morristown	58	184	213
Mount Olive	13	36	15
Passaic	9	25	31
Pequannock	11	55	29
Randolph	59	163	98
Rockaway	31	129	102
Roxbury	18	83	35
Washington	10	50	26
	314	980	899

REPORT ON VITAL STATISTICS.

BURLINGTON COUNTY.

	M.	B.	D.
Base River.	5	26	17
Beverly ..	27	31	4
Bordentown ..	48	123	48
Burlington ..	47	115	143
Chester ..	26	75	67
Chesterfield ..	7	16	21
Chumamunson.	27	91	52
Delvan.	10	62	22
Eastampton ..	4	5	9
Evesham ..	5	20	24
Florence ..	8	62	24
Little Egg Harbor.	11	53	29
Lamberton.	2	35	10
Middelfield ..	8	48	34
Melford ..	10	16	22
Mount Laurel	0	24	17
New Hanover ..	14	27	34
Northampton ..	73	141	74
Pemberton ..	21	12	46
Randolph ..	4	12	3
Shamong ..	0	8	9
Southampton ..	9	25	20
Springfield, ...	5	24	18
Washington ..	2	13	8
Westampton ..	1	4	6
Willingboro ..	5	10	8
Woodland ..	1	0	4
	417	1,065	343

CAMDEN COUNTY.

	M.	B.	D.
Camden City*	4,432	1,139	1,159
Centre ..	5	42	47
Delaware ..	0	20	7
Gloucester City	25	157	141
Gloucester ..	11	66	79
Haddon ..	37	95	63
Stockton ..	42	116	125
Waterford ..	14	60	40
Winslow ..	9	38	30
	4,655	1,733	1,699

*Marriages of non-residents, 2,809.

CAPE MAY COUNTY.

	M.	B.	D.
Cape May City	27	30	35
Dennis.	21	53	42
Lower ..	11	45	43
Middle ..	16	53	33
Upper ..	22	16	34
	97	219	187

MARRIAGES, BIRTHS AND DEATHS.

411

CUMBERLAND COUNTY.

	M.	B.	D
Bridgeton.....	103	294	165
Commercial.....	18	61	23
Deerfield.....	18	32	28
Downe.....	18	26	20
Fairfield.....	7	45	26
Greenwich.....	3	23	13
Hopewell.....	7	37	35
Landis.....	75	148	134
Lawrence.....	20	34	31
Maurice River.....	13	48	28
Millville.....	95	270	131
Stoe Creek.....	6	25	7
	383	1,043	641

ESSEX COUNTY.

	M.	B.	D
Belleville.....	25	69	77
Bloomfield.....	44	195	104
Caldwell.....	15	44	30
Clinton.....	13	62	38
East Orange.....	103	226	154
Franklin.....	8	23	21
Livingston.....	8	21	19
Millburn.....	9	43	23
Montclair.....	46	159	93
Newark.....	1,593	4,920	4,253
Orange.....	175	469	385
South Orange.....	19	69	62
West Orange.....	16	44	49
	2,074	6,344	5,310

GLOUCESTER COUNTY.

	M.	B.	D.
Clayton.....	20	31	40
Deptford.....	8	37	29
East Deptford.....	0	3	2
East Greenwich.....	9	14	21
Franklin.....	16	52	40
Glassboro.....	27	85	46
Greenwich.....	5	34	20
Harrison.....	8	26	27
Logan.....	10	22	17
Mantua.....	5	30	27
Monroe.....	17	45	42
South Harrison.....	1	20	7
Washington.....	14	20	19
West Deptford.....	7	23	8
Woodbury.....	58	112	38
Woolwich.....	16	70	32
	219	617	415

REPORT ON VITAL STATISTICS.

HUDSON COUNTY.

	M	B.	D.
Bayonne	82	389	389
Cliffentberg	12	54	40
Harrison	27	169	209
Hoboken	816	1,261	1,192
Jersey City	1,180	2,148	4,085
Kearny	18	129	129
North Bergen	25	54	215
Town of Union	140	162	244
Union	8	48	41
Weehawken	8	31	25
West Hoboken	79	282	205
	2,069	5,843	8,641

HUNTERDON COUNTY.

	M.	B.	D.
Alexandria	4	17	13
Bethlehem	9	32	25
Clinton	12	51	54
Delaware	16	44	39
East Amwell	8	12	13
Franklin	10	20	14
Frenchtown	26	18	15
High Bridge	13	39	21
Holland	15	30	19
Kingwood	4	18	13
Lambertville	54	63	54
Lebanon	20	58	32
Maritan	17	48	43
Readington	21	37	42
Tewksbury	19	48	26
Union	12	13	9
West Amwell	1	9	11
	265	562	437

MERCER COUNTY.

	M	B.	D.
East Windsor	21	45	34
Ewing	4	7	92
Hamilton	14	34	75
Hopewell	37	57	45
Lawrence	2	16	16
Princeton	83	75	59
*Trenton	625	988	736
Washington	0	16	10
West Middlesex	7	20	16
	755	1,258	1,103

*Marriages of non-residents, 101.

MARRIAGES, BIRTHS AND DEATHS.

413

MIDDLESEX COUNTY.

	M.	B.	D.
Cranbury	14	85	20
East Brunswick	24	80	61
Madison	1	21	17
Monroe	10	82	38
New Brunswick	136	412	386
North Brunswick	12	23	30
Perth Amboy	65	177	180
Piscataway	16	69	51
Raritan	25	55	36
Sayreville	32	53	36
South Amboy	19	70	89
South Brunswick	16	48	49
Woodbridge	12	61	59
	383	1,164	1,049

MONMOUTH COUNTY.

	M.	B.	D.
Atlantic	8	23	20
Eatontown	5	39	38
Freehold	51	87	86
Holmdel	8	15	19
Howell	23	62	38
Long Branch	78	149	73
Manalapan	21	27	29
Marlboro	8	22	28
Matawan	26	54	53
Middletown	36	68	97
Millstone	16	31	21
Neptune	77	131	148
Ocean	14	20	36
Raritan	24	107	87
Shrewsbury	84	108	160
Upper Freehold	29	64	49
Wall	52	75	69
	564	1,096	965

MORRIS COUNTY.

	M.	B.	D.
Boonton	19	33	48
Chatham	31	91	85
Chester	10	39	34
Hanover	15	54	135
Jefferson	7	12	18
Mendham	14	20	28
Montville	9	6	20
Morristown	54	164	213
Mount Olive	12	36	16
Passaic	9	25	31
Pequanock	11	55	29
Randolph	59	163	98
Rockaway	31	129	162
Roxbury	16	83	35
Washington	10	60	26
	314	980	899

REPORT ON VITAL STATISTICS

OCEAN COUNTY.

	M	B.	D.
Berkeley.	2	20	10
Brick	37	97	32
Dover	28	40	67
Eagleswood	4	8	4
Jackson	4	24	17
Lacey	1	7	10
Manchester	10	37	13
Oran	1	9	4
Plumstead	11	31	24
Stafford	13	30	14
Union	8	22	13
	119	230	221

PASSAIC COUNTY.

	M.	B.	D.
Aquaticanonk	8	32	27
Little Falls	13	28	17
Manchester	1	26	23
Paspaic	106	326	243
Paterson	797	1,887	1,682
Pempton	23	49	32
Wayne	14	22	24
West Milford	12	21	30
	971	2,591	2,062

SALEM COUNTY.

	M.	B.	D.
Alloway	10	21	13
Elmhoro	0	3	4
Lower Alloways Creek	15	21	10
Lower Penns Neck	10	16	21
Mannington	1	13	29
Oldmans	8	27	20
Pilesgrove	16	61	60
Pittsgrove	11	97	23
Quinton	8	34	13
Salem	63	80	107
Upper Penns Neck	36	34	23
Upper Pittsgrove	11	9	13
	137	420	371

MARRIAGES, BIRTHS AND DEATHS.

415

SOMERSET COUNTY.

	M.	B.	D.
Bedminster	17	26	34
Bernards	14	41	38
Branchburg	5	5	21
Bridgewater	84	146	149
Franklin	20	55	80
Hillsborough	13	45	49
Montgomery	6	28	26
North Plainfield	27	91	56
Warren	13	3	11
	199	440	464

SUSSEX COUNTY.

	M.	B.	D.
Andover	7	20	22
Byram	13	27	14
Frankford	12	26	21
Green	6	12	6
Hampton	5	2	11
Hardyston	14	1	29
Lafayette	6	7	9
Montague	5	1	6
Newton	32	36	36
Sandyston	5	9	9
Sparta	15	8	20
Stillwater	6	10	25
Vernon	12	4	20
Walpack	1	8	1
Wantage	34	40	52
	173	211	281

UNION COUNTY.

	M.	B.	D.
Clark	0	8	6
Cranford	6	22	14
Elizabeth	303	883	711
Fanwood	4	13	17
Linden	5	11	44
New Providence	4	16	13
Plainfield	97	185	162
Rahway	79	125	138
Springfield	6	18	12
Summit	15	40	29
Union	2	17	25
Westfield	12	46	37
	533	1,384	1,208

REPORT ON VITAL STATISTICS.

WARREN COUNTY.

	M	B.	D
Altamuchy...	1	7	20
Belvidere	38	37	21
Blairstown.....	7	42	17
Franklin	7	6	13
Frellinghuysen	11	14	17
Greenwich	7	15	6
Hackettstown	19	42	40
Hardwick	2	10	9
Harmony	12	24	17
Hope	12	19	47
Independence	2	14	11
Knowlton	28	19	22
Lopatcong	2	20	18
Mansfield	14	12	12
Oxford	37	114	64
Pahquatty	1	0	1
*Phillipsburg	447	246	140
Pohatcong	10	32	13
Washington	44	79	56
	778	764	546

*Marriages of non-residents 302.

TOTALS OF MARRIAGES, BIRTHS AND DEATHS.
FOR ALL THE COUNTIES.

	M.	B.	D.
Atlantic	228	528	529
Bergen	226	727	434
Burlington	417	1,065	543
Camden	4,055	1,733	1,891
Cape May	97	219	187
Cumberland	333	1,043	541
Essex	2,074	6,344	5,210
Gloucester	219	617	415
Hudson	2,099	5,243	6,541
Hunterdon	265	562	427
Mercer	755	1,252	1,103
Middlesex	333	1,156	1,049
Monmouth	504	1,096	903
Morris	214	990	599
Ocean	119	320	221
Passaic	971	2,391	2,032
Salem	167	420	371
Somerset	199	440	464
Sussex	173	211	251
Union	533	1,334	1,206
Warren	778	764	546
	15,726	29,099	26,547

RETURNS OF DEATHS FROM ALL CAUSES.

Return of Deaths from all Causes and certain specified Diseases.
Year ending

DEATHS AT ALL AGES.

COUNTIES	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death rate per 1,000.	Death rate per 1,000 without cities of over 5,000.	Deaths under five in each town, or comparison of these with total deaths.	Number of deaths from chief preventable diseases.	Comparative number of deaths in each 100 from chief preventable diseases.
Atlantic .	144	47	35	162	143	2	533	25,278	2.08	18.23	35.63	153	5.81
Bergen .	163	75	57	142	150	4	631	42,356	14.97		38.01	244	28.21
Burlington .	201	67	79	241	233	8	843	50,283	14.22	13.21	30.97	294	34.33
Camden .	485	180	170	528	314	5	1,001	87,079	10.29	20.20	39.66	753	42.55
Cape May .	84	18	20	46	63	1	187	11,327	16.22		27.81	59	31.19
Cumberland .	150	79	45	191	173	10	641	45,418	14.11	14.07	34.32	243	27.92
Essex . .	1,407	759	480	1,716	910	7	5,310	232,332	22.81	13.40	40.77	2,233	42.30
Gloucester .	102	36	23	112	125	4	415	26,077	14.33		33.25	123	22.03
Hudson .	1,851	1,205	638	3,095	840	12	6,611	282,261	23.53	19.09	46.02	2,811	42.31
Hunterdon .	71	29	30	115	180	3	497	37,420	11.68		22.88	123	28.60
Mercer .	245	81	75	379	270	18	1,103	73,764	14.06	14.08	31.37	412	37.35
Middlesex .	272	146	92	283	247	9	1,049	69,295	17.09	14.61	30.85	408	37.96
Monmouth .	214	85	88	275	312	11	945	87,733	14.54	14.74	30.26	357	36.11
Morris .	189	99	101	248	279	3	890	50,775	17.71	16.53	29.91	325	36.15
Ocean .	42	15	15	67	80	2	221	16,401	13.40		25.79	72	42.55
Passaic .	341	301	163	509	337	21	2,062	94,985	21.82	12.93	43.25	819	38.05
Salem . .	67	36	45	97	124	2	371	26,006	14.26	13.12	27.76	135	36.39
Somerset .	66	36	38	146	153	5	464	27,635	16.79		26.29	151	32.54
Sussex .	53	26	20	69	109	4	281	22,401	12.54		28.12	82	29.14
Union .	286	154	101	380	279	4	1,208	66,853	18.07	11.46	30.75	409	33.85
Warren .	116	42	47	142	197	4	548	38,656	14.18	18.66	35.53	161	34.03
Totals .	8,842	3,512	2,307	8,088	5,586	140	26,543	1,397,647	18.99	14.97	39.01	10,272	29.13

NOTE.—Under the heading "Number of deaths from chief preventable diseases" the first

Of those dying under one year, 1,952 died under one month, of which 1,358 died in the large cities, years, 7,578 died in the larger cities. Total death-rate from consumption for the State as compared periods, or which deal with small numbers, are only approximate, since temporary causes may have in large aggregates. The number of deaths before twenty, in proportion to the rest, is much more from preventable diseases.

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrheal diseases.	Consumption—males.	Consumption—females.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accidents.
2 10	9 12	..	10	4	7	40	2	99	42	27	63	34	40	26	49	39	16	5	4	30
7 27	..	14	12	26	6	96	35	71	75	51	79	81	53	70	13	5	12	27
17 103	1	15	2	31	51	6	250	113	134	140	135	95	50	127	105	22	3	17	72	
.. 6	3	10	..	12	13	13	17	11	21	13	17	17	6	..	1	4
4 14	4	25	6	81	48	56	67	37	39	28	58	43	25	2	5	11
20 152	70	16	58	394	19	720	460	304	576	459	238	218	400	236	129	23	45	177		
3 15	5	..	2	17	1	41	31	16	33	24	32	21	43	39	7	2	1	19		
55 178	2	234	62	80	541	37	859	376	393	819	552	345	233	336	317	113	25	75	245	
2 8	..	5	..	4	8	4	82	21	37	40	10	44	19	64	22	19	3	5	32	
9 28	..	8	1	9	28	2	148	95	89	106	53	78	41	123	70	21	6	13	44	
7 17	23	2	5	64	4	152	60	54	116	58	74	33	65	40	27	2	5	68		
11 29	21	2	11	24	4	123	74	58	92	44	74	52	94	72	35	2	10	44		
9 14	18	..	16	75	5	84	49	55	92	41	97	28	101	52	19	7	6	40		
1 18	..	..	1	4	2	20	10	21	7	13	29	7	26	13	9	3	3	9
14 34	66	13	17	106	6	318	123	120	247	178	134	70	116	95	36	9	17	88		
4 16	2	..	1	28	1	33	31	31	36	13	29	10	35	18	10	3	1	20		
6 13	2	..	2	12	2	41	40	33	47	26	44	23	48	31	16	8	5	17		
.. 6	7	2	2	8	2	21	15	19	40	12	23	10	31	23	4	2	1	10		
9 18	26	7	7	48	1	128	79	86	140	106	104	50	87	66	28	8	11	68		
3 10	1	..	3	28	1	54	40	41	62	28	53	22	44	38	14	2	8	13		
203 724	3	533	118	275	1,574	114	3,377	1,772	1,677	2,842	1,923	1786	1036	1,091	1450	578	117	254	1077	

eleven diseases are classed including consumption, male and female.

Of those dying under one year, 4,906 died in the larger cities. Of the 10,354 that died under five with the total death-rates, 12,99, the deaths being 2,253 in cities, 1,191 outside. Rates for short been in operation, and small numbers do not eliminate or balance errors which practically disappear informatory as to local causes affecting health than the total deaths. See, also, the number dying

*Return of Deaths from all Causes and certain specified Diseases,
for the year ending*

CITIES HAVING OVER 5,000 POPULATION	DEATHS AT ALL AGES.							Estimated population.	Death rate per 1,000.	Deaths under five in each 100, or comparison of these with total deaths.	Number of deaths from chief preventable diseases.	Comparative number of deaths in each 100 from chief pre- ventable diseases.
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.					
Atlantic County.												
Atlantic City ..	*79	22	30	32	53	1	207	9,914	*28.93	37.81	76	25.43
Burlington County												
Bordentown ..	17	4	3	33	31	...	83	5,857	15.02	33.86	28	31.82
Burlington City	23	14	17	41	37	2	134	7,103	20.13	32.13	45	32.17
Camden County.												
Camden City ..	321	120	120	308	102	2	1,150	61,864	18.78	39.43	610	48.00
Gloucester City	45	19	17	40	20	...	141	6,481	21.82	42.53	60	42.35
Cumberland Co'ty												
Bridgeton	48	18	10	51	40	3	166	11,129	14.81	36.96	58	34.54
Millsville	41	17	14	33	23	3	131	9,755	13.43	23.66	66	30.31
Essex County.												
Newark.	1,157	641	324	1,364	676	1	4,258	160,172	25.59	43.26	1,623	48.15
Orange	114	49	30	121	71	...	385	16,850	22.85	42.34	162	42.59
Hudson County.												
Bayonne	125	84	48	81	50	1	389	16,046	24.24	52.73	178	44.47
Harrison	56	49	23	65	13	3	209	7,843	26.65	50.24	98	46.89
Hoboken	303	219	113	340	127	...	1,102	43,099	25.57	47.82	492	44.65
Jersey City	1,117	711	386	1,370	470	6	4,065	179,746	22.66	44.97	1,691	41.60
Town of Union	69	41	20	41	35	...	206	10,433	19.74	53.40	106	50.97
Mercer County.												
Trenton	237	73	52	243	140	11	756	60,801	14.94	41.00	311	41.14
Middlesex County												
New Brunswick	96	65	38	109	70	2	386	19,132	20.18	41.71	171	44.30
Perth Amboy.	74	28	16	30	19	...	160	7,513	24.76	54.83	66	35.45
Montmouth County												
Long Branch ..	39	4	7	22	13	4	72	5,800	12.41	45.99	27	37.50
Morris County.												
Morristown ...	39	43	36	40	55	...	213	8,760	24.32	36.50	113	53.06
Passaic County												
Passaic City ..	87	42	28	53	31	2	243	9,776	24.86	52.71	115	47.33
Patterson	516	236	143	508	267	18	1,688	73,067	23.02	44.71	635	40.00
Salem County.												
Salem City ..	13	11	15	31	34	1	107	5,884	18.16	24.30	48	44.96
Union County.												
Elizabeth	187	118	31	227	126	1	711	35,231	20.18	43.04	257	44.60
Plainfield	37	10	13	54	42	1	163	9,543	16.97	29.01	48	29.69
Rahway	27	10	13	44	36	1	133	7,186	19.20	28.81	49	35.55
Warren County.												
Phillipsburg ..	42	17	12	34	34	1	140	8,760	15.98	42.75	51	36.43
Totals	4,908	2,573	1,642	5,600	2,715	84	17,499	792,540	22.04	43.31	7,300	41.73

NOTE.—Estimated populations are approximated, and we believe the census of 1890 will enable

*Probably due to infants brought to the city sick.

†This death rate is calculated on the resident estimated population, whereas the real population
terion of health conditions.

*in the Cities of over 5,000 population, of the State of New Jersey,
June 30, 1889.*

PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Smallpox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption--males.	Consumption--females.	Acute lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary disease.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
1	6				1	9	1	32	10	13	25	20	27	16	25	26	2		4	11
2	3				1			3	3	14	5	7	7	3	12	3	1		3	2
1	4		5		1	4	4	11	6	8	16	14	0	7	11	15	1			5
17	90		13	2	11	22	6	169	79	91	64	97	59	37	76	71	16	3	13	47
	1		1		2	11		23	12	10	11	12	6	3	10	7	2		2	5
	4		2	2	1	2	1	21	12	12	27	8	12	7	14	10	7			5
	4					9	1	27	10	12	8	10	4	3	8	7	4			
22	131		48	16	50	243	14	532	369	342	463	557	223	166	300	133	91	18	30	140
	7		5		1	22	3	69	34	19	44	26	17	24	25	15	17	1	5	17
4	4		10	1	4	49	4	60	7	20	43	31	10	16	23	11	3	1	2	23
6	4		9	3	5	28	1	22	12	10	36	26	3	4	9	4	2		3	6
4	24		24	2	19	162	7	132	67	51	112	73	68	23	47	54	22	5	15	46
32	132		172	54	45	223	21	522	232	254	528	366	219	147	198	192	60	12	47	163
3	5		6	1	2	27	2	39	6	14	27	10	12	3	8	7	4		1	1
5	20		3	1	9	30	2	130	69	52	80	45	47	24	56	44	12	3	9	28
1	6		9	2	3	60	1	54	28	17	39	17	25	20	17	14	9	3	4	22
2	2		2			8		37	9	6	30	23	5	3	3	5	4		1	12
1	1		2	2		4		10	6	1	5	4	9	1	6	6	1	1		4
3	2		12		5	30		39	9	15	17	6	15	6	17	16	2	1		6
7	7		6	2	9	25	1	47	11	7	22	21	7	9	13	8	1	2	3	7
10	24		59	11	9	78	7	245	108	102	207	141	112	58	56	77	23	7	12	73
2	10		3			12		7	6	8	11	6	7	5	10	4	1	1	1	2
5	9		14	7	4	40		55	43	48	62	57	49	26	41	34	14	4	5	46
	1		2		3	3	1	19	10	11	15	9	22	2	12	9	4		2	6
	6		6			1		11	12	14	14	11	10	2	12	9	5	2	2	6
	5					12		20	3	6	17	10	11	6	9	7	5		6	1
127	512		413	101	163	1,214	77	2,412	1,189	1,069	1,906	1,433	993	667	1,052	840	334	62	161	587

as to show a general decrease of death rates.

is often several times larger, and on account of this floating population, the death rate is not a cri-

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES.

ATLANTIC COUNTY

Statistical Divisions.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death rate per 1,000.
Absecon.. . . .	1	..	..	4	3	..	8	..	..
Atlantic City*.. . .	79	22	20	92	33	1	257	2,914	26.93
Buena Vista.	3	4	..	3	6	..	16	..	..
Egg Harbor City . . .	6	..	..	10	11	..	27	..	..
Egg Harbor Township .	25	2	5	18	16	..	66	..	..
Galloway	2	3	4	14	10	..	33	..	..
Hamilton	8	4	2	4	7	1	26	..	..
Hammonden	14	10	4	9	25	..	62	..	..
Mullen	2	1	..	6	4	..	13	..	..
Weymouth.	3	1	..	2	6	..	12	..	..
Totals.	144	47	35	162	143	2	533	25,278	21.08

*This and all other cities that are health resorts have an excessive death-rate by reason of Local boards show this on their records.

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption—males.	Consumption—females.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Purpura.	Accident.
1	1				1	2	1	1	15	13	1	1	27	16	25	20	10		4	11
									1			2	2	1	2	1				
	1				1	2		2	3		1	1	2	3	2	4	1	1	1	2
								1	4	5	5	3	3	3	4	5	2		1	4
								4		4	4		3		2	3	1			7
1	1			3	1	2		4	1	1	3	1	1	1	2	2	1		1	4
								6		2	7	3	7	3	3	6				
								1		1	2				2	3		1		1
								1							3	1	1	1		1
2	10			3	3	19	1	66	27	27	49	38	49	27	44	52	10	2	7	30

temporary increase of population, which also includes a proportion of invalids above the average.

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES.									
BERGEN COUNTY.									
Statistical Divisions.	Year.					Over sixty.	Under sixty.	Total including unclassified.	Estimated population.
Line Number									Deaths into per 1,000
1						2		4	
2						0	1	76	
3						10		31	
4						11		39	
5						8		87	
6						14		87	
Midland..	9		1	8	11			30	
New Barbadoes .	24	2	2	26	21			91	
Orvil.	3		1	3	3			10	
Pallsade ..	3	4		7	7			21	
Ridgefield ...	18	7	4	19	12			60	
Ridgewood	3	1	5	9	10			28	
Saddle River, .	6	3	2	3	8			22	
Union	20	18	12	15	11	1		77	
Washington	7	2	3	14	13	2		41	
Totals. . . .	163	78	57	182	160	4		634	42, 356

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES

BURLINGTON COUNTY									
Statistical Divisions.		Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total including who died.	Estimated population
									Death rate per 1000.
Bass River	...	3	3	4	3	1	1	17	..
Beverly	...	13	2	3	10	10	1	43	..
Bordentown	....	17	4	3	33	31	...	88	5,857 23.46
Burlington	..	22	14	17	41	37	2	143	7,103 20.10
Chester	...	15	2	2	13	12	..	47	..
Chesterfield	...	3	1	3	6	6	..	21	..
Cinnaminson	...	10	0	2	10	14	3	53	...
Dalton	...	7	..	4	7	4	...	22	...
Eastampton	...	..	..	..	2	3	..	5	...
Evesham	...	5	1	2	8	5	..	24	..
Florence	...	9	3	1	6	5	..	24	..
Little Egg Harbor.	...	10	2	1	..	10	1	29	..
Lumberton.	...	4	..	..	2	..	..	10	..
Mansfield	...	5	1	2	8	12	..	28	..
Medford	..	2	2	5	8	15	..	32	..
Mt. Laurel	..	3	1	7	3	3	..	17	..
New Hanover	...	8	1	3	10	13	1	36	..
Northampton	...	19	2	6	24	27	1	79	..
Pemberton	...	10	3	2	13	10	1	46	..
Randolph	...	..	..	..	1	2	...	3	...
Shamong	...	3	3	2	2	1	..	9	..
Southampton	...	5	3	5	6	7	..	29	..
Springfield	..	2	1	..	4	6	..	13	..
Washington	...	..	..	..	3	..	..	3	..
Westampton	...	1	..	..	2	2	...	5	..
Willingboro.	..	2	1	...	2	4	...	9	..
Woodland	...	..	1	1	1	1	..	4	..
Totals	..	204	57	79	241	258	9	643	59,243 14.22

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES.									
CAMDEN COUNTY.							Total, including unclassified.	Estimated population	Death rate per 1000
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.			
Statistical Divisions.									
Camden City	331	120	125	333	192	2	1,189	81,864	14.75
Centre	14	9	5	8	11	...	47	...	...
Delaware	1	1	...	2	3	...	7	...	...
Gloucester City	45	19	17	40	20	...	141	6,461	21.92
Gloucester	19	1	2	23	27	2	79	...	...
Haddon	13	5	5	16	24	...	63	...	...
Stockton	41	24	10	38	31	1	125	...	...
Waterford	14	2	2	13	8	...	40	...	...
Winslow	7	2	3	10	8	...	30	...	...
Totals	483	189	170	528	314	6	1,601	87,679	18.29

*in the Statistical Divisions of the State of New Jersey, for the
June 30, 1889*

PRINCIPAL CAUSES OF DEATH.

Hemittent fever.	Typoid fever.	Small pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption—males.	Consumption—females.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
17	90	1	13	2	11	22	6	169	79	91	94	97	59	37	76	71	15	3	13	47
1	1				8			9		5	5	4	12	1	3	2				
	1		1		3	11		23	12	10	11	13	6	3	10	7	2		2	5
	1	1			1	1		5	8	6	2	6	9	2	16	12			1	2
	3				3	1		7	8	2	4	5	3	4	9	4	2		1	3
			1		4	3		22	5	12	18	14	11		3	4	1			5
	1				1	3		9	1	3	1	1	2	3	1	2				6
	2				2			5	3	4	2	1	1		4	1	2			1
17	103	1	15	2	21	51	6	256	112	124	140	136	95	40	127	105	22	3	17	72

Return of Deaths from all Causes and certain specified Diseases
Year ending

DEATHS AT ALL AGES

CAPE MAY COUNTY.		Under one year	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death rate per 1,000
Cape May City		8	3	3	12	12		35		
Dennis.		10	3	13	6	10		42		
Lower		10	3	3	10	16		43		
Middle		3	3	1	12	14		33		
Upper		3	4	1	6	17	1	34		
Totals.		34	16	20	46	68	1	167	11,527	1.45

REPORT ON VITAL STATISTICS.

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES									
CUMBERLAND COUNTY.									
Statistical Divisions	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty	Undefined.	Total, including unclassified.	Estimated population.	Death rate per 1,000.
Bridgeton	43	18	10	51	40	8	165	11,430	14.51
Commercial .. .	5	1	2	7	8	...	23	...	...
Deerfield,	7	2	2	7	8	1	27	...	...
Downs	4	3	...	8	8	1	24	...	...
Fairfield, . . .	6	1	...	8	11	...	26	...	...
Greenwich, .. .	2	1	...	3	7	...	13	...	...
Hopewell,	7	1	3	9	13	...	23	...	...
Landis	22	14	10	48	26	2	132	...	...
Lawrence . . .	8	1	1	10	11	...	31	...	...
Maurice River	3	0	1	6	7	...	23	...	...
Millville, .. .	41	17	14	13	23	2	131	9,755	13.43
Stee Creek	2	...	...	3	2	...	7	...	...
Totals	150	70	45	191	175	10	641	46,315	14.11

REPORT ON VITAL STATISTICS.

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES.

GLOUCESTER COUNTY.		Age.							Total, including unclassified.	Estimated population.	Death rate per 1,000.
Statistical Divisions.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.					
Clayton	10	6	4	8	12		40				
Deptford	10	5	3	8	5		26				
East Deptford ..	2						10				
East Greenwich	3		1	8	3	1	23				
Franklin	9	3	4	12	12		40				
Glasboro ..	5	9	7	14	8		48				
Greenwich ..	9	1	2	6	8		26				
Harrison ..	2	1	3	3	13		22				
Logan ..	2	1	1	9	3	1	17				
Martus	3	1	2	3	10		27				
Monroe	11	3	5	12	10	1	42				
South Harrison ..	1	1		2	3		7				
Washington ..	7	1	1	4	6		19				
West Deptford, ..	2	2		1	3		8				
Woodbury	16	2	2	7	10	1	38				
Woolwich	3		3	3	16		32				
Totals	102	48	36	112	125	4	411	28,977	14.32		

*in the Statistical Divisions of the State of New Jersey, for the
June 30, 1889.*

PRINCIPAL CAUSES OF DEATH.

Intermittent fever, etc.	Typhoid fever.	Malaria.	Scarlet fever.	Measles.	Whooping-cough.	Croup and Diphtheria.	Erysipelas.	Diarrheal diseases.	Consumption—males.	Consumption—females.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
1	1				1	5		5	15	1	3	5	1	15	15	4	1			15
						1		3	1	1	12	4	1	1	15	3	1			15
1	4	15			1	2		4	3	3	5	1	2	4	15	1				1
1	1							2	1	1	1		1	1	1	1	1			1
	1					1		1	1	1	3	1	1	1	5	5	1	1		1
	1							1	1	1	1	2	1	1	2	2				1
1	1					3	1	4	1	1	4	1	2	2	4	2	2		1	1
	2							1	1		1	1	1	1	1	1				
2								5	1	2	1	1	1	1	2	2				1
								1	2			1	1	1	1	1		1		
1						1		5	1	1	5	1	2	3	4	2				3
1						1		3	1	2	1	1	7	1	6	6				1
3	15	5			2	17	1	41	21	18	32	24	22	21	43	39	7	2	1	19

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES									
HUDSON COUNTY.									
Statistical Divisions.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty	Undefined.	Total, including unclassified.	Estimated population.	Death rate per 1,000.
Bayonne	126	84	48	81	80	1	389	16,046	24.24
Guttenberg	11	11	2	10	8	...	40		
Harrison	56	49	23	56	13	3	209	7,848	26.63
Hoboken	303	219	113	340	127		1,102	43,089	25.57
Jersey City	1,117	711	365	1,370	476	6	4,065	179,748	22.60
Kearny	23	18	14	37	34	1	129		
North Bergen	43	30	16	74	61	1	215		
Town of Union	69	41	20	41	35		206	10,428	19.74
Union	15	11	8	12	5		41		
Weehawken	0	7	3	15	1		35		
West Hoboken	78	34	11	50	32		205		
Totals	1,831	1,205	639	2,095	840	12	6,641	282,261	23.53

*in the Statistical Divisions of the State of New Jersey, for the
June 30, 1889.*

PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Smallpox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption—males.	Consumption—females.	Acute lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
4	4		10	1	4	58	4	80	7	21	43	31	10	15	23	11	3	1	3	21
0	1		1			4		6	3	0	4	4		1		4			1	1
			9	1	3	28	1	13	12	10	36	20	3	4	0	4	3		5	0
1	24		24	2	19	102	7	132	67	61	112	78	86	38	47	54	24	5	15	40
13	132		172	54	46	223	21	522	232	256	526	363	219	147	196	193	60	13	47	163
4	0		6	1	1	4	1	8	10	2	11	0	10	5	14	4	5	2	1	0
	4	0	3	0	1	12	1	25	23	13	16	10	13	7	26	15	1	1	1	0
3	5		6	1	2	27	2	39	6	14	27	10	12	8	8	7	4		1	1
						0		3	3	2	11	0	0		3	2	2	1		2
1			4			1		2	3	1	4	1	2	2	1	1		1	1	4
	3		3		2	16		39	10	0	29	10	8	6	5	12	7	1	1	3
35	170	2	230	62	87	541	37	659	370	383	819	532	345	233	336	317	113	25	75	203

REPORT ON VITAL STATISTICS.

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES.

HUNTERDON COUNTY.									
Statistical Divisions.		Under one year	One to five	Five to twenty	Twenty to sixty.	Over sixty.	Undeclared.	Total, including unclassified.	Estimated population.
									Death rate per 1000
Alexandria ..		1	1	1	4	5		13	
Bethlehem . . .		6	4	2	13	13		38	
Clinton		2	2	3	8	8	1	24	
Delaware		2	2	4	7	23		38	
East Amwell . . .		1	1	2	4	5		13	
Franklin		2		2	3	7		14	
Frenchtown . . .		3		1	4	6	1	15	
High Bridge . . .		5	1	4	6	5		21	
Holland		2	2	1	4	9		19	
Kingwood		1	3		3	6		13	
Lambertville . . .		12	6	4	20	22		64	
Lebanon		6	2	2	11	11		32	
Marlton		7	1	1	16	20		45	
Readington		4	3	2	5	27	1	42	
Tewksbury		10		1	6	11		28	
Union		2			1	3		6	
West Amwell		4				7		11	
Totals		71	29	20	115	169	3	437	37,420 11.68

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES.

Statistical Divisions.	MERCER COUNTY						Total including unclassified.	Estimated population	Death rate per 1,000.
	Under one year	One to five	Five to twenty.	Twenty to sixty.	Over sixty	Unclassified.			
East Windsor	5	1	1	10	16	1	34		
Ewing	10	2	3	46	33	4	106		
Hamilton	9		3	37	22	1	73		
Hopewell	4	1	0	10	13		31		
Lawrence	3			6	3		16		
Princeton	11	1	3	23	20	1	59		
Trenton..	267	73	32	243	110	11	756	50,801	14.94
Washington..	3		1	1	5		10		
West Windsor	4		2	3	7		16		
Totals	245	81	75	374	270	18	1,103	73,764	14.95

*in the Statistical Divisions of the State of New Jersey, for the
June 30, 1889*

PRINCIPAL CAUSES OF DEATH.

Non-typhoid fever.	Typhoid fever.	Small pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption—males.	Consumption—females.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Paralysis.	Accident.
1	4					14		3	6	13	4		1	4	10	1	1		1	1
	1							1	1	4	5		1	4	9	4		1		1
	3							4	3	5	1		10	1	3	3	1		1	1
5	20		2	1	9	20	2	130	69	62	70	45	47	24	36	43	13	2	9	26
1								1	1	1	1		1	2	3	1	1	1		
9	24		2	1	9	24	2	134	95	89	106	52	76	43	123	70	21	6	15	44

REPORT ON VITAL STATISTICS

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES

MIDDLESEX COUNTY										
Statistical Divisions		Under one year	One to five.	Five to twenty	Twenty to sixty	Over sixty.	Undefined.	Total, including unclassified.	Estimated population	Death rate per 1,000.
Granbury	3	1	1	0	0	3	20			
East Brunswick	13	10	4	12	22		61			
Madison	4	1	4	2	0		17			
Monroe	11	6	1	3	10	2	33			
New Brunswick	98	65	38	109	76	2	388	10,132	38.1	
North Brunswick	1	1	2	7	9		20			
Perth Amboy	74	28	15	50	19		186	7,513	24.7	
Piscataway	9	2	2	10	27		51			
Raritan	8	4	2	8	17		39			
Sayreville	10	9	2	11	8	1	36			
South Amboy	20	11	10	27	21		89			
South Brunswick	9	5	4	13	17		48			
Woodbridge	18	2	6	20	14	1	59			
Totals	272	146	92	283	247	9	1,049	50,285	17.00	

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES.

MONMOUTH COUNTY.									
Statistical Divisions.		Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.
Atlantic		5		4	5	5		20	
Eatontown		6	2	5	7	15		35	
Freehold		11	11	7	21	25	1	66	
Holmdel		2	2	1	8	11		19	
Howell		8	4	5	5	16		38	
Long Branch		20	4	7	22	15	4	72	5,800 12.41
Manalapan		5	2	1	6	15		29	
Marlboro		7	2	3	6	10		28	
Matawan		12	6	5	16	8		53	
Middletown		20	5	7	28	30	1	97	
Millstone		4	2		5	10		21	
Neptune		20	11	15	26	27	2	143	
Ocean		9	3	4	16	4		36	
Raritan		22	9	7	27	20	2	97	
Shrewsbury		19	4	7	33	27		100	
Upper Freehold		5	4	3	18	24		49	
Wall		13	12	7	20	17		69	
Totals		214	66	88	275	312	11	965	67,758 14.54

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrheal diseases.	Consumption—males.	Consumption—females.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
1	3		3			1	1	11	2	10	3	4	6	4	2	9	1	1	1	4
	1							8		4	9		3	1	3	3	1			1
1	1		1	1		4		10	6	1	5	4	9	1	2	3	1	1		4
								3		2			1							2
			3			2		4		2	3	5		3	2	4	1			3
2	1		3		1			16	12	4	7	5	3	1	9	7	8		3	5
3	1					1		3	12		1	1	2		6	1	1		1	
					5	2		12	6	2	14	10	11	5	13	12	5		1	4
3	1						1	4	5		4	1	2	2	2	1	2			7
1	3		1		3	2		18	4	5	4	4	8	5	4	10	1		1	4
			1					10	13	7	11	3	10	6	9	4	2			
	4		2			1		5	2	1	1	2	4	1	13	3	3		1	
	5		3			3	2	9	2	1	8	1	8	5	3	5	2		1	4
11	29		21	2	11	24	4	123	74	58	82	44	74	52	94	72	35	2	10	44

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES.

COUNTY		Statistical divisions						Total, including unclassified.	Estimated population.	Death rate per 1,000
		Under one year	One to five	Five to twenty.	Twenty to sixty.	Over sixty.	Unclassified.			
Berkley		2				3		10		
Breck		14	0		11	21	1	52		
Dayton		6	3	0	17	15		47		
Englewood		2			2	4		8		
Jackson			1		4	6		17		
Laguna		1	1		1	1		10		
Manchester		3	1	1	6	7		18		
Oceanside			1	1	1	1		4		
Pasadena		0		2	11	8		24		
Stafford		3	1	3	5	3	1	16		
Union		1	1	2	6	2		15		
Total		42	15	15	67	80	2	221	16,401	11.0

DEATHS.

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*in the Statistical Divisions of the State of New Jersey, for the
June 30, 1889.*

PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Smallpox	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption—males.	Consumption—females.	Acute lung diseases.	Brain and nervous diseases of children	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
1	13				1	4	2	20	10	21	7	13	29	7	26	18	9	8	8	8
1	13				1	4	2	20	10	21	7	13	29	7	26	18	9	8	8	8

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES

PASSAIC COUNTY										
Statistical Divisions.		Under one year	One to five.	Five to twenty.	Twenty to sixty.	Over sixty	Undefined	Total, including unclassified	Estimated population.	Death rate per 1,000.
Aquackanonk...		7	3	2	5	7		27	.	
Little Falls...		2	3	2	2	1		17	.	
Manchester		2	2	2	10	4		23	.	
Passaic		87	42	28	32	21	2	242	9,776	24.56
Paterson		516	236	118	505	281	18	1,682	73,087	23.02
Pompton		3	0	1	5	12		22		
Wayne...		4	2	1	6	11		26		
West Milford...		7	3	2	6	10	1	30		
Totals		641	301	183	590	327	21	2,062	94,955	21.72

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Small pox.	Scarlet fever.	Measles.	Whooping cough	Croup and diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption—males.	Consumption—females.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident
1	1		1			1		2		2	4	1	2	1	3	4	1			
						1		3	1	1	1		1			1				1
								4	2		2	5	1	1	1	3				2
12	7		5	2	8	25	1	47	11	7	23	21	7	9	15	6	1	2	5	7
10	26		59	11	9	78	7	245	108	103	207	141	112	59	86	77	23	7	12	72
						1		5		5	8	2	2		3	1	1			1
1			1					1	1	1	1	5	4	1	5	1				
								5		2	3	2	4		3	2				3
14	34		66	15	17	108	8	318	123	120	247	176	134	70	110	85	34	9	17	86

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES.									
SALEM COUNTY.									
Statistical Divisions.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death rate per 1000.
Alloway	4	2	2	3	3		18		
Blainboro	1	1		1	1		4		
Lower Alloways Creek .	2			1	3		10		
Lower Penns Neck. .	2	1	2	10	3		23		
Mannington	3	2	4	3	13		30		
Oldmans	2	2	2	2	2		20		
Pilesgrove	2	3	9	14	23		60		
Pittsgrove	5	2	2	10	7		28		
Quinton	4	5	1	6	2		18		
Salem	15	11	15	31	34	1	107	5,684	19.15
Upper Penns Neck . . .	11	1		5	9	1	28		
Upper Pittsgrove	4	1	2	1	10		18		
Totals	87	38	45	97	124	2	371	26,008	14.26

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

SOMERSET COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.						Total, including unclassified.	Estimated population.	Death rate per 1,000.
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.			
Bedminster		1		12	20		33		
Bernards	6	1	4	13	16		36		
Branchburg	4	1	2	8	9	2	21		
Bridgewater	22	13	13	47	42	1	148		
Franklin	16	4	9	26	34	2	85		
Hillsborough	9	3	4	12	21		49		
Montgomery	5		3	7	11		26		
North Plainfield	17	7	3	22	7		56		
Warren	1	1		4	5		11		
Totals	86	36	38	146	152	5	465	27,686	16.79

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
2					1	1			3	3	4		5	1	6	5	1	1		1
					1	1		2	5		6	1		4	4	2	3		1	
								1	1	1	2	1	1	4	1	4				3
3	5		1		1	5		14	14	9	14	10	13	8	13	10	4		1	5
	4					1	2	7	7	7	9	6	5	4	7	6	4		1	4
	1							6	2	5	6	1	10	1	8	2	2			1
1	1							2	1	1	4		2	2	5		1			2
	2		1			3		9	7	4	1	6	6	3	3	1	1	2	2	1
						1				3	1	1	2	1	1	1				
6	13		2		2	12	2	41	40	33	47	26	44	28	48	31	16	3	5	17

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

DEATHS AT ALL AGES.

UNION COUNTY.		Statistical Divisions							Estimated population		Death rate per 1,000	
		Under one year.	One to five	Five to twenty	Twenty to sixty	Over sixty.	Undefined.	Total, including unclassified.				
Clark		2	1	1		2		6				
Cranford		4			4	6		14				
Elizabeth		147	119	51	227	126	1	771	22,231	30.19		
Fanwood		3	1	1	5	7		17				
Linden		6	7	3	15	13		44				
New Providence		1	1	2	1	5		10				
Plainfield		37	10	19	54	42	1	163	9,543	14.47		
Rahway		27	10	18	41	33	1	130	7,166	19.29		
Springfield		1	1	1	3	6		12				
Summit		5	2	2	14	4		27				
Union		4	2	2	2	15		25				
Westfield		6	4	2	9	15	1	37				
Totals		289	158	101	340	279	4	1,269	66,833	15.07		

*Return of Deaths from all Causes and certain sp. cified Diseases,
Year ending*

DEATHS AT ALL AGES									
WARREN COUNTY									
Statistical Divisions	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population	Death rate per 1000
Allamuchy	3	1	1	3	10		18		
Belvidere	1			1	14		16		
Blairtown	1	1		3	10		15		
Franklin	3		1	3	6		13		
Frelinghuysen . .		1	1	2	2		17		
Greenwich	1		2	2	3		8		
Hackettstown . . .	4	4	3	12	15		48		
Hardwick	2	1		1	5		9		
Harmony	3		1	3	7		14		
Hope	3	3	1	3	17	1	42		
Independence . . .	2		1	3	6		11		
Knowlton	1	2	3	4	12		22		
Lopatcong	3	2	2	2	7		16		
Mansfield	1	1	1	5	4	1	13		
Oxford	24	5	9	13	14		65		
Pahauquarry			1				1		
*Phillipsburg . . .	42	17	12	34	34	1	140	8,780	15.96
Pohatcong	1	1	1	3	7		13		
Washington	13	1	6	15	20	1	56		
Totals	118	42	47	142	197	4	548	23,054	14.18



SYNOPSIS OF VITAL AND MORTUARY STATISTICS.

The following outline presents the comparative numbers of marriages, births and deaths as follows :

Average for five years ending June 30, 1883 :

Marriages.....	8,589
Births.....	24,281
Deaths.....	21,981

Average for five years ending June 30, 1888 :

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Deaths.....	23,952

This average after June 30, 1885, was on an increased population of 146,917.

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1887.....	4,332
1888.....	4,557

The following is the record for the year, from July 1, 1888, to June 30, 1889 :

Marriages (including 4,072 non-residents).....	15,726
Marriages of non-residents.....	4,072
Births.....	29,099
Still Births.....	1,817
Deaths.....	26,543

*Corrected from last report.

For the year 1888-9, we find that of the 26,543 deaths occurring 6,842 were under 1 year of age, 3,512 between 1 and 5 years; 2,395 between 5 and 20 years; 8,068 between 20 and 60 years; and 5,526 over 60 years. Of those under 1 year, 1,952 died under 1 month.

NOMENCLATURE AND FORMS FOR WEEKLY RETURNS.

There has been but little change by medical and norological authorities in the nomenclature of disease since that given in our fifth report.

The nomenclature of Dr. Farr are still the basis of all more recent forms with such slight variations as local authorities have advised.

Thus diptheria and croup are now usually stated as one. Tonsilitis is classed by some with stomactic and by others with zymotic disease. Malarial diseases are sometimes placed under the general class, miasmatic, or else separately classified. A few are ready to greatly enlarge the class, parasitic or microbic, and to transfer to it a large number of diseases.

NOMENCLATURE OR THE REVISED CLASSIFICATION OF DISEASES.

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We know of no improvement since sufficient to authorize change and so repeat it as then presented since the sixth report is out of print.

Transcribe from sixth report, page 286 to 290, opposite cerebro-spinal fever, line 12, put cerebro-spinal meningitis; opposite enteric fever, line 14, put typhoid.

I.

SPECIFIC FEBRILE DISEASES, OR ZYMOTICS.

1. *Miasmatic Diseases.*

Small-pox	{	Vaccinated.
		Unvaccinated.
		No statistics.

Chicken-pox.

Measles.

Epidemic rose-rash.
 Scarlet fever.
 Typhus.
 Relapsing fever.
 Influenza.
 Whooping-cough.
 Mumps.
 Diphtheria.
 Cerebro-spinal fever, cerebro-spinal meningitis.
 Simple continued fever.
 Enteric fever, typhoid fever.
 Other miasmatic diseases.

2. *Diarrhœal Diseases.*

Simple cholera.
 Diarrhœa, dysentery.

3. *Malarial Diseases.*

Remittent fever.
 Ague.

4. *Zoogenous Diseases.*

Hydrophobia.
 Glanders.
 Splenic fever.
 Cow-pox and vaccination.

5. *Venereal Diseases*

Syphilis.
 Gonorrhœa, stricture of the urethra.

6. *Septic Diseases.*

Phagedæna.
 Erysipelas.
 Pyæmia, septicæmia.
 Puerperal fever.

II.

PARASITIC DISEASES.

Thrush.
 Other vegetable parasitic diseases.
 Hydatid disease.
 Other animal parasitic diseases.

REPORT ON VITAL STATISTICS.

III.

DIETIC DISEASES.

Starvation, want of breast milk.

Scurvy.

Intemperance. { Chronic alcoholism.
 { Delirium tremens.

IV.

CONSTITUTIONAL DISEASES.

Rheumatic fever, rheumatic heart.

Rheumatism.

Gout.

Rickets.

Cancer, malignant disease.

Tabes mesenterica.

Tubercular meningitis.

Phthisis.

Scrofula, Tuberculosis.

Peripura, hemorrhagic diathesis.

Anemia, etc.

Diabetes mellitus.

Other constitutional diseases.

V.

DEVELOPMENTAL DISEASES.

Premature birth.

Atelectasis.

Cyanosis.

Spina bifida.

Imperforate anus.

Cleft palate, hair lip.

Other congenital defects.

Old age

VI.

LOCAL DISEASES.

1. *Diseases of Nervous System.*

Inflammation of brain.

Apoplexy.

Softening of brain.

Hemiplegia, paralysis.

Paralysis agitans.

Hydrocephalus (not acute).

Insanity (general paralysis of insane).

Chorea.

Epilepsy.
Convulsions.
Laryngismus stridulus.
Idiopathic tetanus.
Paraplegia and disease of cord.
Others, nervous system.

2. Diseases of Organs of Special Sense.

Otitis, otorrhœa.
Epistaxis and disease of nose.
Ophthalmia and disease of eye.

3. Diseases of Circulatory System.

Endocarditis, valvular disease.
Pericarditis.
Hypertrophy of heart.
Angina pectoris.
Syncope.
Aneurism.
Senile gangrene.
Embolism, thrombosis.
Phlebitis.
Varicose veins.
Others, circulatory system.

4. Diseases of Respiratory System.

Laryngitis.
Croup.
Others, larynx, trachea.
Emphysema, asthma.
Bronchitis.
Pneumonia.
Pleurisy.
Other diseases of respiratory system.

5. Diseases of Digestive System.

Stomatitis.
Dentition.
Sore throat, quinsy.
Dyspepsia.
Hæmatemesis.
Melæna.
Disease of stomach.
Enteritis.
Ulceration of intestines.
Ileus, obstruction of intestines.
Stricture and strangulation of intestines.

Intussusception of intestines.
Hernia.
Fistula.
Peritonitis.
Ascites.
Gallstonea.
Cirrhosis of liver.
Others, liver disease.
Others, digestive system

6. *Diseases of Lymphatic System.*

Disease of lymphatics.
Disease of the spleen.

7. *Diseases of Gland-like Organs of Uncertain Use.*

Bronchocele.
Addison's diseases.

8. *Diseases of Urinary System.*

Nephritis.
Bright's disease, albuminuria.
Uræmia.
Suppression of urine.
Calculus.
Hæmaturia.
Disease of bladder and prostate.
Others, urinary system.

9. *Diseases of Reproductive System.*

a. *Diseases of Organs of Generation.*

Ovarian disease.
Disease of uterus and vagina.
Disorder of menstruation.
Pelvic abscess.
Perineal abscess.
Disease of testes, penis, etc.

b. *Diseases of Parturition.*

Abortion, miscarriage.
Puerperal mania.
Puerperal convulsions.
Placenta prævia, flooding.
Phlegmaria dolens.
Other accidents of childbirth.

*in the Statistical Divisions of the State of New Jersey, for the
June 30, 1889.*

PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhoeal diseases.	Consumption—males.	Consumption—females.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
1	5	9	14	7	4	40		2	1	1	3	1	12	1	1	1				3
								1	45	48	53	67	46	38	41	24	14	4	6	10
		1	3			1		1	3	1	3	3	4	1	3		2			4
						2			1	1	4	10	5	3	10	1				
	1		2		1	3	1	19	10	11	15	9	22	9	13	9	6		3	6
	5		8			1		11	12	14	14	11	10	12	12	9	6	2	12	6
			1						1	1	1	2	5	1						
1								3	6	3	3	2	2	1	4			1		1
12	2				1					1	3	4	3	12	3	1				2
9	1				3	1		1	1	2	9	12	5	1	3	1		1		1
9	18		26	7	7	48	1	124	79	96	140	106	104	59	87	58	28	4	11	68

REPORT ON VITAL STATISTICS.

*Return of Deaths from all Causes and certain specified Diseases,
Year ending*

WARREN COUNTY.		DEATHS AT ALL AGES.						Estimated population	Death rate per 1000.
		Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty	Undefined.		
Statistical Divisions							Total, including unclassified.		
Allamuchy.....	3	1	1	1	10		26		
Belvidere.....	1				14		15		
Blairstown.....	1	1			10		12		
Franklin.....	3		1	1	4		19		
Frelinghuysen ..	1	1	1	1	7		11		
Greenwich.....	1		1	1	3		6		
Hackettstown	4	4	5	12	16		41		
Hardwick.....	2	1		1	5		9		
Harmony ..	3		1	6	7		17		
Hope ..	9	5	1	9	17	1	42		
Independence ..	2		1	3	5		11		
Knowlton ..	1	2	3	4	12		22		
Lopatcong ..	5	2	2	2	7		18		
Mansfield ..	1	1	1	3	4	1	11		
Oxford ..	24	5	5	13	14		61		
Pahaquarry ..			1				1		
*Phillipsburg ..	42	17	12	34	34	1	140	8,700	15.98
Pohatcong ..	1	1	1	6	7		16		
Washington.....	13	1	5	15	20	1	55		
Totals	116	42	47	142	197	4	548	20,656	14.16

SYNOPSIS OF VITAL AND MORTUARY STATISTICS.

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The largest death rate was from June 30,1888, to June 30, 1889, the actual number over the largest rate of any previous year, having been 2,842.

The marriages occurring in Camden and other places, as a result of the Pennsylvania law, so far as known, are not counted in our reckoning, although necessarily recorded. This excess as we have it is as follows :

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Marriages (including 4,072 non-residents).....	15,726
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Still Births.....	1,817
Deaths.....	26,543

*Corrected from last report.

For the year 1888-9, we find that of the 26,543 deaths occurring 6,842 were under 1 year of age, 3,512 between 1 and 5 years; 2,395 between 5 and 20 years, 8,068 between 20 and 60 years; and 5,516 over 60 years. Of those under 1 year, 1,952 died under 1 month.

NOMENCLATURE AND FORMS FOR WEEKLY RETURNS.

There has been but little change by medical and norological authorities in the nomenclature of disease since that given in our fifth report.

The nomenclature of Dr. Farr are still the basis of all more recent forms with such slight variations as local authorities have advised.

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We know of no improvement since sufficient to authorize change and so repeat it as then presented since the sixth report is out of print.

Transcribe from sixth report, page 286 to 290, opposite cerebro-spinal fever, line 12, put cerebro-spinal meningitis; opposite enteric fever, line 14, put typhoid.

I.

SPECIFIC FEBRILE DISEASES, OR ZYMOTICS.

1. *Miasmatic Diseases.*

Small pox	{	Vaccinated
		Unvaccinated.
		No statistics

Chicken pox

Measles.

Epidemic rose-rash.
 Scarlet fever.
 Typhus.
 Relapsing fever.
 Influenza.
 Whooping-cough.
 Mumps.
 Diphtheria.
 Cerebro-spinal fever, cerebro-spinal meningitis.
 Simple continued fever.
 Enteric fever, typhoid fever.
 Other miasmatic diseases.

2. *Diarrhœal Diseases.*

Simple cholera.
 Diarrhœa, dysentery.

3. *Malarial Diseases.*

Remittent fever.
 Ague.

4. *Zoogenous Diseases.*

Hydrophobia.
 Glanders.
 Splenic fever.
 Cow-pox and vaccination.

5. *Venereal Diseases*

Syphilis.
 Gonorrhœa, stricture of the urethra.

6. *Septic Diseases.*

Phagedæna.
 Erysipelas.
 Pyæmia, septicæmia.
 Puerperal fever.

II.

PARASITIC DISEASES.

Thrush.
 Other vegetable parasitic diseases.
 Hydatid disease.
 Other animal parasitic diseases.

REPORT ON VITAL STATISTICS.

III.

DIEBIC DISEASES.

Starvation, want of breast milk.

Scurvy.

Intemperance. { Chronic alcoholism.
 { Delirium tremens.

IV.

CONSTITUTIONAL DISEASES.

Rheumatic fever, rheumatic heart.

Rheumatism.

Gout.

Rickets.

Cancer, malignant disease.

Tabes mesenterica.

Tubercular meningitis.

Phthisis.

Scrofula, Tuberculosis.

Purpura, hemorrhagic diathesis.

Anemia, etc.

Diabetes mellitus.

Other constitutional diseases.

V.

DEVELOPMENTAL DISEASES.

Premature birth.

Atelectasis.

Cyanosis.

Spina bifida.

Imperforate anus.

Cleft palate, hair lip.

Other congenital defects.

Old age.

VI.

LOCAL DISEASES.

1. *Diseases of Nervous System.*

Inflammation of brain.

Apoplexy.

Softening of brain.

Hemiplegia, paralysis.

Paralysis agitans.

Hydrocephalus (not acute).

Insanity (general paralysis of insane)

Chorea.

Epilepsy.

Convulsions.

Laryngismus stridulus.

Idiopathic tetanus.

Paraplegia and disease of cord.

Others, nervous system.

2. Diseases of Organs of Special Sense.

Otitis, otorrhoea.

Epistaxis and disease of nose.

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Endocarditis, valvular disease.

Pericarditis.

Hypertrophy of heart.

Angina pectoris.

Syncope.

Aneurism.

Senile gangrene.

Embolism, thrombosis.

Phlebitis.

Varicose veins.

Others, circulatory system.

4. Diseases of Respiratory System.

Laryngitis.

Croup.

Others, larynx, trachea.

Emphysema, asthma.

Bronchitis.

Pneumonia.

Pleurisy.

Other diseases of respiratory system.

5. Diseases of Digestive System.

Stomatitis.

Dentition.

Sore throat, quinsy.

Dyspepsia.

Hæmatemesia.

Melæna.

Disease of stomach.

Enteritis.

Ulceration of intestines.

Ileus, obstruction of intestines.

Stricture and strangulation of intestines.

Intussusception of intestines.

Hernia.

Fistula.

Peritonitis.

Ascites.

Gallstones.

Cirrhosis of liver.

Others, liver disease.

Others, digestive system.

6. Diseases of Lymphatic System.

Disease of lymphatics.

Disease of the spleen.

7. Diseases of Gland-like Organs of Uncertain Use.

Bronchocele.

Addison's diseases.

8. Diseases of Urinary System.

Nephritis.

Bright's disease, albuminuria.

Uræmia.

Suppression of urine.

Calculus.

Hæmaturia.

Disease of bladder and prostate.

Others, urinary system.

9. Diseases of Reproductive System.

a. Diseases of Organs of Generation.

Ovarian disease.

Disease of uterus and vagina.

Disorder of menstruation.

Pelvic abscess.

Perineal abscess.

Disease of testes, penis, etc.

b. Diseases of Parturition.

Abortion, miscarriage.

Puerperal mania.

Puerperal convulsions.

Placenta prævia, flooding.

Phlegmaria dolens.

Other accidents of childbirth.

10. *Diseases of Locomotor System.*

Caries, necrosis.
 Arthritis, ostitis.
 Others, locomotor system.

11. *Diseases of Integumentary System.*

Carbuncle.
 Phlegmon, cellulitis.
 Lupus.
 Ulcer, bed-sore.
 Eczema.
 Pemphigus.
 Others, integumentary system.

VII.

DEATH FROM VIOLENCE.

1. *From Accident or Negligence.*

Fracture, contusion.
 Gunshot wounds.
 Cut, stab.
 Burn, scald.
 Poison.
 Drowning.
 Suffocation.
 Otherwise.

2. *From Homicide.*

Murder, manslaughter.

3. *From Suicide.*

Gunshot wounds.
 Cut, stab.
 Poison.
 Drowning.
 Hanging.
 Otherwise.

4. *By Execution.*

Hanging (execution.)

VIII.

DEATHS FROM ILL-DEFINED CAUSES.

Dropsy.
 Debility.
 Atrophy and inanition.

Mortification.

Tumor.

Abscess.

Hemorrhage.

Sudden (cause unascertained.)

Not specified, or ill-defined.

The following changes are some of those advocated: add Roth-ēlan to zymotic diseases, also erysipelas. Some would add pneumonia and tuberculosis because of claimed microbic origin. Croup is often left out and included under diphtheria. Quinsy is claimed by some as a stomachtic disease and by others as miasmatic or glandular leuco.

The term zymotic is still in convenient use as designating chief communicable diseases, although the idea of their depending on a ferment, as once supposed, is abandoned or modified.

WEEKLY MORTUARY REPORTS FOR CITIES.

These need to differ somewhat from the horology which guides physicians in diagnosis and classification, yet it is desirable to have them uniform in order for comparison.

They should give area of districts and wards and population, and so locate deaths.

Deaths in institutions should be separated, and where the person has not been over six months from home should be assigned to their respective wards or marked non resident.

In many cities deaths in tenement houses containing three families or over should be specified.

For comparison the annual death rate per thousand for corresponding week should be given, and either of the year previous or for five previous years.

It is common in some cities to give some idea of the character of the ward, thus:

Ward 1—Banks, office buildings, wholesale stores, some tenements for laborers, immigrant hotels.

Ward 4—Tenements of a poor class, sailors' boarding houses, many Italian laborers.

We greatly desire more uniformity of method on the part of our cities in their weekly reports and present the following, after careful study and comparison as a brief outline:

HEALTH DEPARTMENT OF
DIVISION OF VITAL STATISTICS.
REPORT FOR THE WEEK ENDING

— deaths were registered in this office during the week ending at noon of Saturday, —, representing an annual death-rate of — per 1,000 on an estimated population of —

Deaths from Principal Diseases by Wards,* for Week ending Saturday, —.

WARD.	AREAS IN ACRES AND POPULATION BY CENSUS OF 1900.	CHARACTER OF DWELLINGS AND POPULATION. GENERAL SANITARY CONDITION	(Cerebro-spinal Meningitis. Typhoid fever, Krysiptosis, Malarial fever, Measles, Scarlatina, Small-pox Typhus fever, Whooping-cough, Dysentery, diarrhoea, Rheumatism, Phthisis, Bronchitis, Bright's disease, Neph- ritis and cystitis, Ileocecal and digestive system, Tetanus and nervous disease, Pneumonia, Puerperal diseases, All causes, In institutions Under one month, Total under five years, Five to twenty, Twenty to sixty, Over sixty.									

1 } Area, } Banks, office buildings, wholesale stores, shipping region,
Pop., } some tenements for laborers, immigrant hotels, cattle
} garden.
2 } Area, } Stores and warehouses, office buildings, a few tenements.
Pop., }

Annual death-rate per 1,000. —

Particulars regarding Births, Deaths, Marriages, and Still births for Week ending Saturday, —.

	White.			Colored.			Native Parents.			Foreign Parents.			Mixed Na- tives of Parents Percentage Unknown			Wid- owed.	Not Stated.	Non- res- idents.
	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.			

Marriages
Births
Deaths
Still-births

We herewith subjoin the annual death rates for some of the chief cities of the world with their estimated populations for 1888. While generally correct there is here and there a case where the population is probably over estimated and so the death rate reduced. Also the modes of collection in some few instances are imperfect, especially is this true of two or three American cities which might be named.

Cities.	Estimated Present Population	Annual Death Rate per 1,000.
New York.	1,580,261	19.86
Baltimore.	500,848	13.00
Boston	415,000	21.62
Brooklyn	814,505	16.51
Chicago	1,100,000	17.82

The following table will show the average number of deaths from each of the principal causes for the Ten years, beginning July 1, 1878, and also for the year, from July 1, 1888, to July 1, 1889.

It is to be remembered that in this period there had been an increase of inhabitants of over 20 per cent., and hence twenty-five deaths per thousand now, is not more than twenty would have been ten years ago.

**YEARLY AVERAGE OF DEATHS FROM PRINCIPAL DISEASES FOR
TEN YEARS, BEGINNING JULY 1, 1878.**

Remittent.....	289
Typhoid	579
Small Pox.....	71
Scarlet Fever.....	610
Measles.....	135
Whooping Cough.....	161
Diphtheria	1280
Erysipelas.....	101
Diarrhoeal Diseases....	2592
Consumption.....	3182
Acute Lung.....	2,438
Brain and nervous diseases of children.....	1,762
Diseases of Heart and Circulation..	1,813
Renal and Urinary Diseases.....	753
Adult Brain and Spinal Diseases.....	1,405
Adult Digestive and Intestinal Diseases.....	1,093
Cancer.....	482
Acute Rheumatism.....	75
Puerperal	245

DEATHS FROM VARIOUS CAUSES FROM JULY 1, 1888, TO
JULY 1, 1889.

Remittent.....	203
Typhoid	724
Small Pox	3
Scarlet Fever.....	533
Measles	118
Whooping Cough.....	278
Diphtheria	1,574
Erysipelas	114
Diarrhoeal Diseases	3 877
Consumption.....	3,449
Acute Lung.....	2,862
Brain and Nervous Diseases of Children.....	1,923
Diseases of Heart and Circulation.....	1,786
Renal and Urinary Diseases.....	1,056
Adult Brain and Spinal Diseases.....	1,791
Adult Digestive and Intestinal Diseases.....	1,450
Cancer.....	579
Acute Rheumatism.....	117
Puerperal	254

[NOTE.—It is to be remembered that the latter list represents over 200,000 more inhabitants and that the returns for the first few years were more important.

As we have heretofore, from time to time, commented on each disease, and as to most of them there are no new facts to communicate, we confine our remarks this year briefly to Remittent Fever, Typhoid Fever, Diphtheria and Consumption.

As to remittent fever the yearly record shows a favorable diminution of deaths from this cause. There will no doubt be seasons in which owing to excessive heat or moisture, or sudden alterations, or the opening up of new areas there will be sudden recurrence of attacks. While the relation of undrained lands and stagnant water to it are unmistakable, yet it is the combination of influences that produces untoward results. We cannot too earnestly direct attention to the evils of wet lands, stagnant water and mill-dams, where these cause large overflow amid vegetable decay and crowded populations. While those acclimated do not so uniformly suffer, new residents are affected and others discouraged from settlement. The relation of micro-organisms thereto is being closely studied. As the most recent and concise summary we give a contribution of Prof. William Osler, M. D., of Johns Hopkins Univer-

sity, "On the Value of Laveran's Organisms in the Diagnosis of Malaria."

"The attitude of the profession on the question of micro-organisms of malaria is one of judicious skepticism. Between the *cacillus malariae* of Klebs and Tomassi-Crudelli, and the protozoa described by Laveran, the average doctor cannot be expected to decide; but even among workers and teachers, there is by no means unanimity. So far as I know, there has been no confirmation of the observations of the first named authors on a specific bacillus in the disease. It is far otherwise with the organisms described by Laveran, whose work has now been confirmed by competent observers, in Italy, America and India. I do not know of a single clinician or pathologist, living in a suitable region, which has really worked at the subject, who has not been convinced of the truth of Laveran's statements. Doubtless many have had my experience. In 1886, at the meeting of the "Association of American Physicians," when Dr. Councilman presented a summary of Laveran's views, I (speaking out of the fullness of my ignorance) was extremely skeptical. When I had the opportunity of giving to the question, the study which its importance demanded, I was soon convinced, and I had the satisfaction of confirming, in almost every particular, the observations which Laveran had made, and discussed the whole subject in a paper, published in the "British Medical Journal," March 12, 1887. For the past two years, at the Philadelphia and University Hospitals, I have had abundant opportunities of studying cases of malaria, with an ever-deepening conviction that the organisms of Laveran are peculiar to the disease.

Putting aside, for the time, until the complete life history of these organisms shall be worked out, the question of their etiological relation to the disease, I would briefly refer to their diagnostic importance. In my former paper, I gave in this connection several interesting illustrations. Since that date, I have, in an increased experience, become even more convinced of the really great value in doubtful cases of these blood examinations. In ordinary intermittent fever, of recent origin, there is hardly ever any question in the diagnosis, and any doubts which may exist, quinine readily clears up. The value of the blood examination lies particularly in the chronic cases and in anomalous forms. Here one has to be constantly on guard and it may be impossible for days to determine

definitely the nature of the affection. We have since the opening of the hospital, admitted twenty-four cases of malaria to the wards, of which, in seven instances, the diagnosis was definitely determined by blood examination, and could have been determined in no other manner. So important do we consider it, that we now, as a matter of routine, examined the blood of all cases of fever, and indeed all cases of low temperature, which seem so peculiar in certain forms of chronic malarial poison. We have yet to determine fully the relation of the forms to each other and the complete life history of the parasite in the body; and, what is much more important, to ascertain its existence outside and to learn the conditions of its development and the way in which it gains access to the body."

In respect to Enteric or Typhoid Fever no new facts of importance have been elicited during the year. It is still recognized as a manufactured disease, to be greatly diminished by sanitary measures. What Dr. T. Thorne, said in 1887 is still true, namely, in which he says "Enteric Fever has been enormously diminished and this has been brought about through the adoption of methods which the new knowledge showed to be necessary." While excremental pollution chiefly through water supply is the main source of its spread the views of Prof. Brouardel of Paris and others, that moistened air will also convey it is gaining ground. Prof. Dixon of Philadelphia, has recently claimed the leakage from imperfect sewers as one of the causes of its extension. The bacillus of Eberth is still regarded as diagnostic of the disease although other microbes are often present.

Our chief reliance must continue to be a thorough guarding of first cases, the most exact sanitary precautions, a thorough investigation of water supplies and scrupulous attention to the condition of all surroundings. We have recently had occasion to investigate seven cases occurring on a farm in a family of eight persons in which the first two cases were children who were drinking water from a barn yard well.

The origin of some cases is still obscure. It sometimes seems to arise de novo, or else the ground must be taken that cases of septic fever, or other modified forms of low fever simulate it.

Diphtheria still continues to be both in city and county the great menace of child life. It seems to have come to stay, yet where first cases are promptly met with the conjoined methods of sanitation

and medicine it is largely within the range and duty of our control. While the bacillus of Loeffler still seems to be the most prominent one in its diagnostic, or causative relations, as with most of the communicable diseases, the question is still one of doubt. "In some cases the specific organism seems to be a streptococcus, in others a bacillus, while perhaps the most important idea gained is, that primarily the disease is a local one." From a paper by Dr. B. K. Rachford of the Medical College of Ohio, Cincinnati, January 1889, on the *etiology of diphtheria*, (*The Medical News*, February 2, 1889,) we quote the following: "The present state of our knowledge derived from the investigations of the last few years have failed to find in the blood or tissues of any patient the organism which could possibly be etiologically responsible for the disease."

Every diphtheritic patient has many species of bacteria in his mouth; these are chiefly septic bacteria, but many of them are not pathogenic. He then proceeds to show that the alkaloids or ptomaines are introduced into the system chiefly from the complications occurring in the disease. He claims that many of the complications occur from the action of these bacteria.

Prof. J. Lewis Smith, in a paper read before the New York County Medical Association, March 18th, 1889, said, "Each year of recent investigation has strengthened the belief that the cause of diphtheria is a microbe; but it is still a matter of doubt which microbe is the causal agent, or whether there may not be more than one species of bacteria, which by their action upon and in the tissues produce disease. He then went on to speak of the more recent investigations of Wood and Formad, Klebs and Löffler, Cheyne, von Hoffman, Wellenhof and Oertel, and stated that the latter, who was one of the earliest advocates of the theory of the microbic origin of diphtheria, now admits that the causative action of bacteria, though plausible, is not proven. The specific principle must be introduced from without, but if it obtain a lodgement upon the wet and mouldy surface of any filthy accumulation, it may find there a nidus favorable for its development. The fact appears to be fully established, as would be shown later on in the paper, that the diphtheritic virus is frequently propagated in foul and damp localities, apart from the animal tissues and independently of the sick. The theory of the

causation of diphtheria which is gaining acceptance throughout the world is, that it is produced by a specific microbe or microbes, whose action is chiefly on the surface, or at no great depth, and that blood poisoning occurs mainly from a ptomaine or ptomaines produced by microbic agency. In order to obtain a knowledge of the ptomaines, chemistry must aid microscopical investigations."

As to prevention he speaks thus: "As regards the small extent of the area of its contagiousness and the persistence and highly infective character of its virus within that area, diphtheria resembles scarlet fever, and is unlike measles and pertussis, the specific principles of which, although they have a wider contagious area, are more volatile and more quickly dissipated. The most efficient method of preventing the propagation of diphtheria is the isolation and disinfection of patients, the prompt and thorough disinfection of the apartments in which they have been treated, and of the bedding and furniture of these apartments, and the exclusion or prevention of all noxious gases."

Prof. T. Mitchell Prudden, M. D., Biologist of the College of Physicians and Surgeons, New York City, has, during the present year, furnished an important paper on the Etiology of Diphtheria. (See April and May, 1889, of the American Journal of Medical Sciences.) We quote as follows from his summary:

"We have found, by a critical examination of the studies which have heretofore been made on diphtheria by the use of the modern methods of research, that no definite species of bacteria has been discovered which could fairly be positively regarded as the cause of the disease. * * * *

"Our observations, taken together, seem to lead us to so strong a presumption that the streptococcus is the causative factor, in this group of cases, at least, of diphtheria, that it practically amounts to a demonstration.

"We have found reason for believing on biological and experimental grounds that the streptococcus occurring so constantly in these cases of diphtheria (called by him streptococcus diphtherial), is probably identical with the streptococcus pyogenes and streptococcus erysipelatos. It has been shown that the apparent identity of the inciting species of bacteria in erysipelas, in some forms of phlegmonous inflammation and in at least certain groups of cases of diphtheria is not only not inconsistent with our knowledge of the path-

ology and symptoms of these three forms of inflammation, but serves to account for various facts concerning the nature and spread of diphtheria which have hitherto seemed obscure.

" We have found that the crypts of the fossils form a favorite nesting-place for the streptococcus and that it may lie harmlessly there even in considerable numbers, unless some lesion of the mucous membrane provides conditions suitable for its growth, when it may enter upon a career of active and, as it would seem, fateful proliferation.

" In the presence of the streptococcus in large numbers in the local lesions of diphtheria and in its absence in any considerable number as a rule in the healthy state, we find ground for the belief that the symptoms of diphtheria are probably in large measure due to the absorption of a soluble poison produced by the bacteria at the seat of their most active proliferation.

" We have demonstrated that the streptococcus of diphtheria is not really destroyed by drying, but both in the form of pure cultures on threads and fabrics and in the pseudo-membrane itself may retain its vitality for long periods when dried in the air. We have tested its vulnerability when brought in contact with some of the commonly used antiseptic agents and found first that the vapor of burning sulphur is very inefficient and unreliable in destroying the germs. We have found that carbolic acid and creolin in considerable strength destroy the streptococci but in dilute solutions are inefficient; while sublimate even in very dilute solutions heads the list in its killing power. But we have also found, as was to be expected, that all of these germicides are much less efficient when applied to the bacteria which lie embedded in the pseudo-membranes and the tissues, than when they are free in the pure cultures. * * * *

" As to the details of a mode of room disinfection upon which we may rely, I think it may not be out of place here to formulate a set of directions which largely embody, and are in part a transcript of the official regulations for disinfection as required by the health authorities in Berlin in 1887.

" All bed-linen, clothing, handkerchiefs, etc., which are to be washed, and all cloths which have been used for dusting the room, should be placed for at least twenty-four hours in 2 per cent solution of carbolic acid, then boiled for an hour in water, and then washed with strong soapsuds.

“ The disinfection of the room and its contents at the close of the illness will be more easy, and certainly efficient, the greater the care which has been exercised in removing all unnecessary articles of furniture, hangings, pictures, etc., from it at the commencement of the disease.

“ In the first place, all clothing which cannot be washed, bedding, mattresses, pillows, etc., carpets, cushions and all such furniture as has not exposed wooden frames, should be tied up in cloths (sheets) which are saturated with 2 per cent. carbolic solution, and sent away to be steamed at the public disinfecting station.¹

“ All valueless articles of furniture or clothing should be burned—best at the disinfecting station—but in case of necessity the smaller articles may be disposed of in the house furnace or range at such time as cooking is not going on.

Polished articles of furniture, picture-frames, metallic articles, etc., should be firmly rubbed off on all their surfaces with dry cloths, or when permissible, with cloths wet with 5 per cent. carbolic acid. The cloths used should be immediately burned or put into 2 per cent. carbolic solution.

“ If the walls of the room are hard-finished or painted, they, together with all doors, windows, and woodwork, should be thoroughly washed, as should finally the floor, with 5 per cent. carbolic solution. If the room have papered or frescoed walls, the floors should be thoroughly flushed with 5 per cent. carbolic solution, and then all the walls should be thoroughly and firmly rubbed down in every part with lumps of bread, the crumbs being allowed to fall on the carbolized floor. Then the woodwork is washed with carbolic solution, the crumbs gathered up and burned, and the floors washed with water.

“ The room should be finally exposed as fully as possible to the air for at least twenty-four hours, and longer if it is practicable.

“ Now, this will seem at first, no doubt, a very formidable process, but where a large public disinfecting plant is available it is,

¹ A large and well-arranged disinfecting plant is now being planned for the city of New York, and will, it is hoped, soon be in operation. Where such disinfecting stations do not exist, as they should in every large town, a thorough scrubbing of the surfaces of mattresses, pillows, etc., with 2 per cent. carbolic solution and subsequent prolonged exposure to the air, and boiling of blankets, coverlets, etc., after washing in the carbolic solution, will be perhaps the best procedure.

after all, comparatively simple; and, what is more important, if faithfully and intelligently executed, will insure purification of the infected room. Of course, other germicides than carbolic acid might be used for washing the room, such as 1: 1000 sublimate solution, but the experimental data which these studies furnish indicate that the carbolic solution will kill streptococcus if it comes in contact with it."

R. Stern, of the Hygienic Institute of Breslau, is so impressed with the risks of dust that he recommends as a means of disinfecting rooms which have been occupied by persons suffering from infectious diseases, that as soon as the patient has been removed, the room be closed and allowed to remain so for at least twenty-four hours, after which it is to be quietly entered and floors, wall surfaces and furniture mopped with cloths saturated in corrosive sublimate 1: 1000. Under no consideration is dusting to be countenanced.

PHTHISIS OR CONSUMPTION.

The question, which perhaps, more than any other has for the past year attracted the attention of biologists and physicians is that relating to the communicability of phthisis or other forms of tuberculoer disease. The tendency undoubtedly is to regard most diseases as dependent upon micro organisms and to look upon all such as communicable. Especially when the same disease can be produced in animals by inoculation, there are those who are very open to conviction that it is also transmissible in other forms. Yet it is to be remembered that there are not more than two or three diseases as to which there is agreement in respect to the diagnostic microbe, and that in some, as in diphtheria, inoculation has failed to reproduce the same disease, even where a specific microbe is somewhat confidently claimed. The Hygienic Institute of Berlin under the superintendency of Dr. Koch has made such brilliant achievements and by its successes, its publications, and by having supplied all but one of the Universities of Germany with a biological professor has gained such prestige as to secure, what sometimes seems a too ready acceptance of its views, even to the obscuration of the facts and opinions of those who cannot yet adopt the radical contagion hypothesis. Two papers early in the year by Dr. George Cornet one of the pupils of Koch have

been largely accepted as showing the communicability of Phthisis by means of pulverized sputa. We can not here review all the grounds of this belief or state all the reasons why so many still regard the evidence as questionable. If such views are correct the same grounds for complete isolation apply to it as for instance to Diphtheria. We cannot so completely dissociate the patient from his sputa as to make the spit-cup and disposal of its contents, however important, the reliable protection. We for years past have urged the great importance of the disposal of all sputa from all diseases but in so wide spread a malady occurring in tenement and palace everywhere and with its subjects by multitudes in streets and highways and in all the public modes of conveyance we see little hope of relief in this way. For the past year especially we have made a somewhat careful and extended study of the literature of the subject, of the testimonies of Biologists and the opinions of practitioners and do not find such consensus of opinion as yet warrants definite conclusions. Here is a statement quite shared by many veterinary authorities. It is from the pen of Dr. Brush, a member of the State Medical Society of New York and one who has had large experience with cattle.

E. F. Brush, (Boston Medical and Surgical Journal No. 19, 1889,) after having for several years made a close study of the affection, including the consideration of all available statistics and the habits of the people where it prevails, has come to the conclusion that the only constant factor is the presence of in-bred dairy cattle. Where these are not, he has found human tuberculosis to be absent. He gives a number of statistics to prove this position; among these the prevalence of the disease among the Hottentots, where a number of distinct breeds of cattle are raised. The same is true of Ireland and Denmark, where the number of cattle is large. In Ireland, where the cattle are few, the disease is very rare, though the climatic conditions are almost identical with those of Denmark. In the portions of Greenland where dairy cattle are common, phthisis is prevalent; while in those in which the number of cattle is extremely small, the disease is almost unknown. Phthisis was unknown in Australia until after the introduction and breeding of cattle. The author cites quite a number of other instances. From the statistics produced, he concludes that there is little doubt that in-bred cattle are the chief etiological factor in the production of human

tuberculosis. They foster the germ, prevent its extinction, and sow it abundantly in the human race. No other germ has so hard a struggle for existence in man as has the tubercle bacillus, as shown by the fact that of the immense number exposed to its contagion comparatively few take the disease. On the other hand, the in-breeding of cattle has made these delicate, and a very large proportion of them are infected by the disease. He believes that the disease was originally derived from the bovine species, and that were it not for cattle it would die out. To many, meat and milk are the great modes of prepagation.

On the other hand, Cornet and his followers regard it as chiefly diffused by buccillary dust. The doctrine of heredity is practically denied.

The period is one in which we may well be on the alert, in studying facts that are proven by experience. We are to be receptive of truth and cautions as to hypothesis.

The following editorial from a recent member of the London Lancet as to "the contagiousness or otherwise of tuberculosis is timely."

"Few questions are more worthy of the most anxious attention, and few seem so difficult of satisfactory elucidation. Since from one-fifth to one-seventh of the human family succumb to tuberculosis in various forms, and since the disease when well established is one of the most formidable nature, the questions of its etiology and of its preventive treatment are of overwhelming importance. Yet, although the discovery of Koch is now a good many years old, and its substantial accuracy is no longer seriously questioned, we are still far from having attained a much to be desired unanimity regarding its clinical significance and its practical bearings. The difficulty arises largely from the fact that on this question pathology and clinical observation seem to speak with discordant voices. The former shows strong *a priori* ground for expecting that tuberculosis should be contagious; the latter very feebly, if at all, confirms this expectation. The pathologist seeing in a specific virus the cause of the disease, and perceiving the unlimited facilities offered for its dissemination is naturally predisposed to regard tuberculosis as infective. The clinical observer, on the contrary, finds that to him the most striking features of the disease are its dependence upon hereditary taint, upon unhealthy modes of life,

upon malnutrition and the like ; and he is at a loss to discover sure instances of its transmission from one individual to another, although the opportunities for such transmission are unhappily only too abundant. If the attention which is now being given to the question of the transmission of tuberculosis from animals to man should avail to throw new light upon the wider question of the contagiousness of the disease, it will have been exceedingly well bestowed.

“ It is believed by many able pathologists that these two apparently discrepant views of tuberculosis are in reality quite reconcilable, that the apparent opposition between them is like the dispute in the fable as to whether the shield was made of gold or of silver. One observer saw only one side, and forthwith proclaimed that it was made of gold, while the second observer who saw only the opposite side was equally convinced that it was made of silver. It did not occur to either disputant that his opponent was right as well as himself. Hence it may be suggested that tuberculosis has its resemblance on the one hand to the communicable diseases, and on the other to those maladies of which impaired nutrition is the most essential feature. It may be argued with much apparent plausibility that just as some maladies, such as measles or small-pox seem to find a suitable nidus in almost everyone exposed to their influence (unless protected by a previous attack or by vaccination), and in these cases individual susceptibility offers only very slight variations, so there are other diseases, such as diphtheria, where susceptibility is relatively much more important, and there may be diseases where susceptibility is really the main question and the presence of the virus relatively unimportant. There can be little doubt that predisposition, whether of constitution or of environment, is the main feature in the etiology of tuberculosis, but we must not let this conclusion, borne in as it is upon us by such a multitude of facts, blind our eyes to the truth that predisposition is not causation.

“ The suggestion of the communicability of tuberculosis and its dependence upon the specific virus naturally raised the strongest hopes of a new and fruitful departure as regards preventive and curative treatment. It must be owned that these hopes have been doomed to disappointment. The antiseptic treatment of phthisis, begun with so much hope, has not prospered, even in the hands of its warmest advocates, and is probably now being quietly dropped by the majority of those who are sufficiently unprejudiced to refuse

to become the victims of a preconceived idea. Inhalations by the respiratory passages, injections per rectum, the air of pine forests, carbolic acid, creasote, fluoric acid, and a host of other such remedies have had their trial, and the result has been disappointing. We are still forced to rely for success, mainly on measures that seek to diminish susceptibility and to increase the constitutional resistance to the disease, on tonics, high feeding, analeptic measures generally, and change of climate.

If the present attitude of the profession in this country towards the question of the communicability of tuberculosis is still one of expectancy and suspended judgment, we must be content simply to take stock of our present knowledge and to await further light. Pathology and clinical observation must go hand in hand, and it is not too much to hope that the great scientific activity of the present age may within a reasonable time succeed in removing the apparent opposition now subsisting between them in connection with the subject of tuberculosis.

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ERRATA.

NOTE.—Owing to omission in the law as to Proof, the earlier pages of this Report did not have final correction. Besides some errors in orthography, notice the following corrections:

Page 16, Line 8, for “Durhow” read “Durham.”

“ 17, “ 15, for “matrification” read “nitrification.”

“ 24, “ 5 from bottom, after “subject” read “A. P. H. Asso.”

“ 25, “ 5, “ “ for “contest” read “contrast.”

“ 28, “ 4, for “demonstration” read “regulation.”

“ 28, last line, for “to” read “so.”

“ 30, 12th “ from bottom, omit “either.”

“ 35, Line 13. ends special article on “Cities and their Needs.”

“ 35. “ 14, after “each” insert “so.”

“ 45, “ 14, after “action” place a period and capital F.

“ 45, “ 18, for “after” read “often.”

“ 77, “ 3, read “lencocytes” for “cucocytes.”

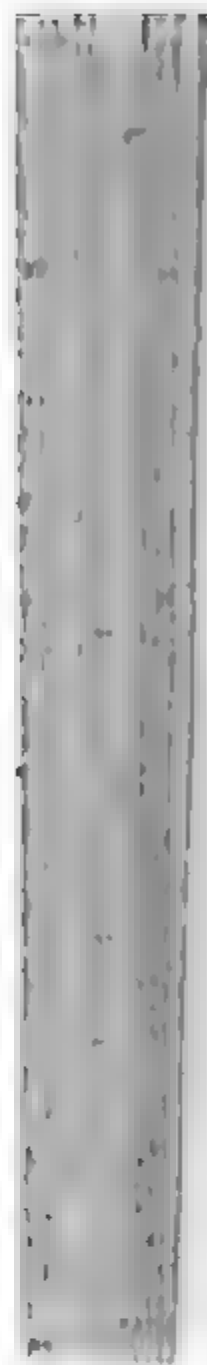
“ 77, “ 15 from bottom, read “nodules” for “nochules.”

“ 131, “ —, “In Love parentis” should read “*in loco parentis*.”

“ 379, “ 19, read “materies” for “matenas.”

“ 380, “ 10, read “microphytic” for “micrphytic.”

“ 387, “ 3, read “diphtheria” for “diptheria.”







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